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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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5/year April 5, 1982 Vol. XVI, No. 14

roughs d Guilty In B700 Suit

By Tim Scannell
CW Staff

AUSTIN, Texas — Burroughs Corp. has been found guilty of fraud, misrepresentation and unconscionable actions in a case here involving a wholesale distributor that had problems with its B700 minicomputer system.

After a month-long trial, a jury found Burroughs guilty of violating the Texas Deceptive Trade Practices Act for misrepresenting the capabilities of a B700 sold to the Nelson Specialty Supply Co., an appliance parts wholesaler.

However, the decision could be reversed and the case dismissed if the court rules that Nelson Specialty violated a two-year statute of limitations law by waiting nearly four years to file its suit against Burroughs, according to David Donaldson, the defendant's lead attorney.

A hearing on the time limitations issue is scheduled for this Friday.

Although Nelson Specialty's lawyers — lead attorney Philip Maxwell and Joseph Longley — are satisfied with the outcome of the trial, a number of loose ends have to be settled before the case finally rests. For example, the jury found for the plaintiff and ordered Burroughs to pay about $27,000 in actual damages and $30,000 in legal fees. Under Texas law, however, the actual damages amount could be trebled, Longley stated.

Judge Harley Clark of the 250th District Court of Travis County, who presided over the trial, will make a decision on this point at an April 9 hearing.

Concerning another loose end, Longley said, the jury found the

(Continued on Page X)

Fills Gap Between 4341-2, 3081

IBM Adds Three-Model 3083 Line

By Tom Henkel
CW Staff

RYE, N.Y. — IBM revealed yet another piece of its big-systems strategy last week by announcing the 3083, a three-model line of processors that offers more power than the 4341 Group 2 but less than its top-of-the-line 3081 processors.

IBM also announced a stand-alone water-cooling unit, the 3087 Model 2, that allows users of 4300 air-cooled processors to move to the more powerful water-cooled processors in the IBM lineup.

The three models of the newly announced 3083 series are:

- The Model Group E, which offers about 2.8 times the performance of a 4341 Group 2. The Model Group E unit is available with 8M to 16M bytes of main storage and eight or 16 I/O channels.
- The Model Group B, which offers 8M, 16M, 24M or 32M bytes of main memory and eight, 16 or 24 I/O channels. This processor features 1.5 times the performance of the Model Group E.
- The Model Group J, which features two times the performance of the Model Group E. Like the B, the J comes with 8M, 16M, 24M or 32M bytes of main memory and eight, 16 or 24 I/O channels.

The 3083 is a uniprocessor version of the 3081. It employs the same basic architecture, including IBM's Thermal Conduction Modules, a heat removal unit that employs small pistons that transfer heat away from the chips.

In addition, the 3083 processors use the same chip technology as the 3081, IBM said.

The 3083 processors are supported by IBM's MVS/SP operating system Releases 1.1, 1.3 and above. The processors are also supported by MVS/SP Version 2, the 31-bit addressing version of MVS announced by IBM last fall. Like the 3081, the 3083 supports bimodal operation, which means users can run both 24-bit and 31-bit MVS programs simultaneously, IBM said.

In addition, the 3083 series supports the extended addressing version of VM, also announced last fall by IBM.

The water-cooling 3087 Model 2 converts the 3083 from a water-cooled to an air-cooled processor. The cooling distribution unit eliminates the need to tie into an external water supply, according to an IBM spokesman, who explained that it circulates water through the 3083 system and then dissipates the heat into the computer room, where it can

(Continued on Page 4)

ICP Honors 342 Packages

By Marcia Blumenthal
CW Staff

SCOTTSDALE, Ariz. — Up, up and away was the spirit at this desert resort last week as International Computer Programs, Inc. (ICP) honored 342 software products at its 11th annual Million Dollar Awards ceremony.

Contributing to the festivities of the event was international balloonist Maxi L. Anderson, who demonstrated the art of gas ballooning to the 400 people gathered here for the two-day awards ceremony and conference program.

Cincom Systems, Inc. walked away with the first $250 million award ever given, for its Total data base management program. Started 11 years ago with 29 prizes, the Million Dollar Awards honor proprietary software companies whose individual products have had cumulative sales of $1 million or more.

Although the prize categories reach the lofty heights of $250 million, the most plentiful award category and

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CIA Brass Promises Proof That Journals Aid Soviets

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The deputy director of the Central Intelligence Agency, Admiral B.R. Inman, promised last week to produce proof that the Soviets are augmenting their military capabilities through data in American scientific publications. But a member of the House of Representatives intelligence committee who said he has seen the "proof" pronounced it unconvincing.

Inman told a joint hearing of two House science and technology subcommittees Monday that the press had blown out of proportion his recent proposal that scientific papers undergo prepublication review by the government to make sure strategic technology does not leak to the Soviet Union. Nonetheless, he reiterated his prediction, first made in January to the American Association for the Advancement of Science (AAAS), that a backlash of public opinion against the data leakage will necessitate some form of voluntary censorship by scientists if they want to avoid restrictive legislation or federal regulation [CW, Jan. 18].

Inman said that he is preparing an unclassified summary of intelligence community information that shows the extent of Soviet success in glean-

(Continued on Page 7)

Computer as Strikebreaker? Labor Relations Expert Says Yes

By Marguerite Zientara
CW Staff

CAMBRIDGE, Mass. — Computers can be used effectively as a tool against strikers and may come into increasing play as "strikebreakers."

That is the view of labor relations expert Harley Shaiken, a research associate in the Program in Science, Technology and Society at MIT. Writing in the April issue of MIT's *Technology Review* magazine, Shaiken said that "what ultimately doomed" last summer's strike by the Professional Air Traffic Controllers Organization "was the government's skillful use of a new weapon — computer technology — to keep air traffic moving, gutting the strikers' leverage.

"Soon after the walkout occurred," Shaiken continued, "75% of commercial flights were operating in spite of the fact that some 75% of the air traffic controllers were on the picket line."

While Shaiken traced such efficiency to the Federal Aviation Administration's automated "flow control" procedure for uniformly separating aircraft, others have suggested that there were too many controllers before the strike and that the job action afforded the FAA a perfect opportunity to trim the fat.

"I would disagree with that," Shaiken said in a recent telephone interview. "I think the system had very serious problems, both technically and, obviously, politically, prior to the strike. Overmanning was not one of them.

"Part of the reason that there were a lot of controllers was that the skill and experience was very much vital in terms of safety and having a margin of safety in a wide range of locations," he added.

"What happened here was that under the most difficult of circumstances technically — in that air traffic control remains pretty labor-intensive — it was possible to use the flow control system and other ancillary computerized approaches in order to get by with far fewer controllers, at least for a year or two," he contended.

"The story of this dramatic confrontation underscores the potential importance of computers in labor-management relations in general and strike situations in particular," the article said.

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Female DPers the Top Women Earners, But Still Get Less Than Men in Same Jobs

By Susan Blakeney
CW Staff

WASHINGTON, D.C. — Although in 1981 women DP workers once again earned less than their male counterparts, female DPers earned more than any other group of women workers in the U.S.

So says a recent study from the U.S. Department of Labor's Bureau of Labor Statistics (BLS) which showed that salaries for women still lag significantly behind those of men in the DP work force. According to the report, woman earned about 74 cents for every dollar paid to their male peers. There is a $93/week difference between females and males working in computer operations and systems research areas and a $126/week discrepancy between female and male systems analysts.

The findings were based on analysis of average weekly earnings as reported in the Current Population Survey of U.S. households performed by the BLS last year. The earnings are for wage and salary workers employed full-time (35 hours/week or more) and exclude self-employed people.

	MALE Median Weekly Salaries	FEMALE Median Weekly Salaries	RATIO Of Female to Male Earnings	PERCENT Of Female Workers
Systems Analysts	$546	$420	76.9	25.1
Operations & Systems Researchers	$515	$422	82.0	24.5
Programmers	$447	$329	73.6	28.4
Operators	$342	$232	67.8	63.2

Statistics From the Department of Labor's BLS

Female operations and systems researchers earned weekly median salaries of $422, placing them at the top of the list of highest paid women in the country. Men in the same category earned $515/week but finished 17th in the list of highest salaried men, following a long list of engineers, doctors, lawyers and salesmen, according to the BLS.

Woman computer systems analysts were the second highest salaried female workers in the U.S., with median weekly paychecks of $420. Men with the same jobs were taking home $546, making them the 12th highest salaried workers in the U.S.

Women who worked as computer programmers finished 17th in the top 20 paying jobs for their sex. In contrast, male computer programmers did not appear in the list of top 20 jobs in terms of payment. This is primarily attributable to the fact that male workers with higher salaries in other positions excluded the programmers from the list.

Men still greatly outnumber women in the computer work force — often by a factor of three to one, the government study continued. The only area where the number of women workers surpassed the number of men was in the operators category; 63.2% of all computer operators are women. However, while men were a minority in this area, their paychecks still beat women's by approximately $110/week, the study pointed out.

Finally, the BLS report showed that computer programmers' salaries rose 8.2% between January 1981 and January 1982, while computer operators averaged raises up to 21.3%. Computer operators' salaries were hiked from a median of $252.50/week to $306.50/week in one year.

Showing Products at NCC?

FRAMINGHAM, Mass. — *Computerworld* is planning to devote three issues to the 1982 National Computer Conference, slated for June 7-10 in Houston. The first of these issues will include an "NCC Preview," in which we let our readers know what products, new and old, vendors will exhibit.

To ensure that all products and services displayed at NCC receive proper coverage, we ask that NCC exhibitors send CW all pertinent information no later than April 30. Press packages should include the prices and availability dates of the products and services as well as the name and phone number of a press contact.

The product and contact information should be sent to June Fettig, NCC Products Editor, *Computerworld*, P.O. Box 880, Framingham, Mass. 01701.

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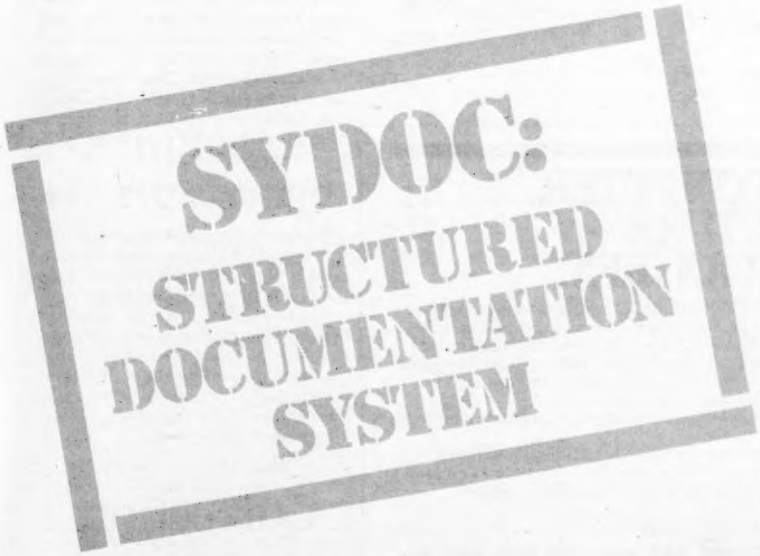

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IBM Reduces Prices on Most 3033 Processors

RYE, N.Y. — In addition to announcing a new line of processors last week, IBM took further steps to decommission its 3033 processor series.

With only the entry-level 3033S processor remaining in new production (the others have been in "limited new" since February), IBM cut purchase prices up to 17% on the rest of the 3033 models and announced four packaged Requested Pricing Quotation (RPQ) deals for the line.

Price reductions of up to 17% were made on the 3033U, 3033A and 3033M processors. The smaller 3033N received a 12% price cut.

In addition, the cost of making model-to-model upgrades and the price of optional channel groups were cut 39% and 10%, respectively, IBM said.

Four packaged offerings that combine RPQs and optional features are available at a cost below the combined total of those items if purchased separately. The packages include the VM Feature Group RPQ and the MVS Feature Group RPQ. Each is available in a four- or six-channel version.

The VM Feature Group includes Virtual Machine Assist, a hardware feature that can reduce the supervisor time required to handle interruptions and some instructions. It also includes the Preferred Machine Assist, a package designed to reduce VM overhead for an MVS/SP guest system.

The Feature Group includes two Extended Control Storage Features that work with the 3033 Extension to provide extended control storage for each of two channel groups, IBM said.

The MVS Feature Group RPQ contains the 3033 Extension and Extended Control Storage Features. The six-channel and four-channel feature groups include optional channel groups containing six and four channels, respectively, extended control storage and data streaming. Those enhancements allow two channels in a channel group to transfer data at speeds up to 3M char./sec, IBM said.

The VM Feature Group RPQ costs $95,000. The MVS Feature Group RPQ costs $50,000. The six- and four-channel Feature Group RPQs cost $245,000 and $225,000, respectively.

IBM Adds 3083 Line

(Continued from Page 1)

system and then dissipates the heat into the computer room, where it can be removed by the air conditioning system.

First customer shipments of the 3083 Model Groups B and J are scheduled for delivery in the first quarter of 1983. The Group E is scheduled for the second-quarter 1983 shipment, while the 3087 Model 2 will be shipped beginning the the third quarter of 1983, IBM said.

A 3083 E with 8M bytes of main storage and eight channels costs $1,120,000. The machine leases for $37,400/mo on a four-year agreement.

A 16M-byte Model Group B with 16 I/O channels carries a $2.4 million price tag. It leases for $55,450/mo on a four-year agreement.

A 3083 J processor with 32M bytes of storage and 24 channels costs $3,220,000 or $101,980/mo on a four-year lease.

The 3087 Model 2 costs $72,000 or $2,400/mo on a four-year plan.

Characteristics \ System	4341 Group 2	3083 Group E	3083 Group B	3083 Group J	3081 Group D	3081 Group K
Relative Performance[1]	66	185	277	370	465	675
Mips[2]	1.2	3.3	5.0	10.0	10.4	15
Memory Size in Bytes (Min-Max)	2M-16M	8M-16M	8M-32M	8M-32M	16M-32M	16M-32M
Purchase Price[3] (Memory Size)	$359,000 (4M)	$1,200,000 (8M)	$2,020,000 (16M)	$3,220,000 (32M)	$3,720,000 (16M)	$4,320,000 (16M)
Lease Price (Lease Term)	$11,550 (2 Year)	$37,400 (4 Year)	$55,450 (4 Year)	$101,980 (4 Year)	$100,440 (4 Year)	$124,000 (4 Year)
Machine Cycle Time (Nsec)	120-240	26	26	26	26	26
Channels (Min-Max)	6	8-24	8-24	8-24	16-24	16-24
Cache (Buffer) Size	16K	Not Available	Not Available	Not Available	64K[4]	128K[4]
Bus Architecture?	No	No	No	No	No	No
Price per 1M Byte Of Main Memory	$15,000	$25,000	$25,000	$25,000	$25,000	$25,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM System 370/158-3 equalling 45. These numbers are designed to put the processor into perspective with other systems. It is not a buyers guide. All systems are not alike. They use different operating systems, instruction sets and architectures, and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For processor only. Console and other prerequisites are not included.
4. The 3081 employs a dyadic, or closely coupled dual-processing system. The 3081D has two 32K-byte buffers, one in each processor, for a combined total of 64K bytes. IBM doubled the buffer size in the 3081K. That unit offers two 64K-byte buffers for a combined total of 128K bytes.

CW Chart

The Latest Lineup

AT&T Wins Rate Increases

WASHINGTON, D.C. — AT&T won a rate increase from the Federal Communications Commission last week that increased by 4.1% charges for its Wide-Area Telecommunications Service (Wats). Most private-line rates went up 1.6%, while the cost of dial-up long-distance calls rose about 1.4%.

The rate hikes were effective April 2.

The newly approved tariff includes a change in billing procedures that raised rates further for some data tranmissions via the telephone network. Calls were formerly billed at the rate that applied when the connection was established, even if the call were to terminate in a different time period. Under the new scheme, the charges applicable during each time period will be used.

Correction

"DP Teacher Charged in Funds Transfer Scam" [CW, March 29] referred to an alleged bogus company called Computer Technical Institute (CTI). The acronym "CTI" is also used by Computer Technicians, Inc., a legitimate computer consulting and services company in East Brunswick, N.J. Computer Technicians, Inc. is not now nor has it ever been associated with Computer Technical Institute.

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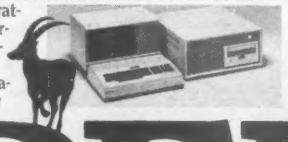

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More Than Price at Issue

Data Dictionary an Element in State Dispute

By Lois Paul
CW Staff

MINNEAPOLIS — There is more than the price tag of a home-grown data dictionary involved in a current dispute between Minnesota's legislative auditor and the State Department of Education's DP department.

The dispute, which revolves around the legislative auditor's report criticizing the Department of Education's computer system, reflects the dilemma of a state DP agency in this time of fiscal restrictions. The report made reference to a $400,000 data element dictionary that was developed in-house by the Department of Education that apparently does not function satisfactorily.

The data dictionary development effort began in 1978. Written in Cobol, the software runs on dual Burroughs Corp. B6800 systems located at one of the state's regional computer centers, which also support Burroughs DMS-2 data base management system.

The Department of Education's DP group had proposed the purchase of a data dictionary package, but its cabinet refused the request. Allen Baumgarten, the evaluation specialist for the legislative auditor's office who helped prepare the report, characterized this decision as "penny-wise and pound-foolish."

Goal Unclear

Baumgarten said the Department of Education never seemed clear about what it wanted to accomplish with the data dictionary. Its DP department began with a hierarchical structure and then switched to a flat file method to increase processing efficiency and flexibility; Baumgarten thinks they should have prepared for the frequent changes that are required.

"There is no simple, easy summarization of complex data processing activities," Charles Coskran, director of educational data systems, said. "If there is an error on the part of the auditor, it is in trying to simplify things."

His department is facing growing demands from end users who have experienced budget cuts and who look to DP as a means of improving their productivity. This is in spite of the fact that Coskran's group also has faced cutbacks and has several unfilled vacancies.

He disagreed with the report's $400,000 figure for the data dictionary development effort. He speculated that it must include salaries of anyone involved with the data acquisition unit going back to 1976-'77, even though they might have been handling other projects, such as inventory forms design and evaluation.

Documentation Problems

Coskran agreed with the report's criticism of his group's documentation and said he is working on this. However, he said the charges of poor planning can be applied to most projects that are regarded with hindsight.

According to Baumgarten, there may be hearings on the basis of the report, noting these hearings most likely will take place in 1983, which is a budget year.

Coskran said he does not fear the report. He expressed confidence in his staff, which is supporting up to 30 applications, most of which are rewritten each year to reflect changing rules and regulations.

Coskran's staff is attempting to make the data dictionary more usable, with key search capability and a software program that helps them sort data and evaluate it before incorporating it into the data dictionary. In addition, a committee has been formed to analyze and approve or disapprove any new data elements incorporated into the dictionary, he said.

FCC to Suggest Decree Change

WASHINGTON, D.C. — The Federal Communications Commission (FCC) is reportedly preparing to recommend substantial modification of the proposed consent decree signed by AT&T and the Justice Department in January. The decree, if accepted by U.S. District Court Judge Harold Greene, would end the government's lengthy antitrust suit against the phone company.

In its present form, the decree calls for AT&T divestiture of the Bell operating companies. After their divestiture, the Bell operating companies would be restricted to local exchange service and to interconnection of these facilities with those of the long-distance carriers, according to the FCC.

Because of widespread fears that this arrangement threatens the financial viability of the operating companies, FCC sources said the commission will propose removal of the service limitation so that the operating companies can enter any field they wish.

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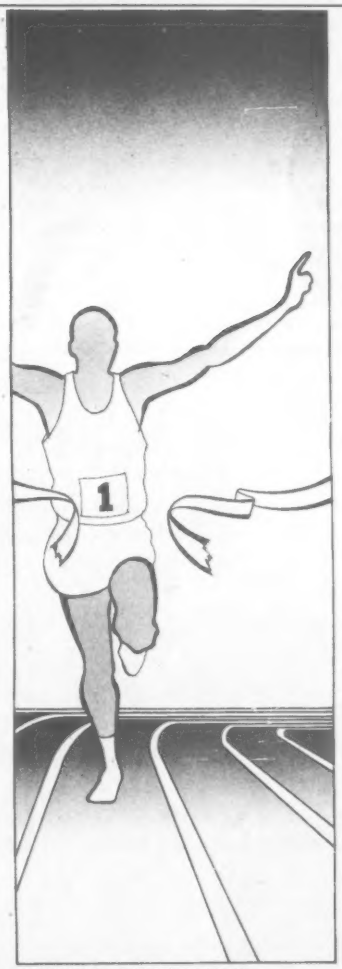

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Stanford VP Takes Issue With Inman

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — "The way we do business in this country is the best protection of national security," declared Stanford University Vice-President Robert M. Rosenzweig at a House Science and Technology Subcommittee hearing last week.

The Stanford official was addressing the recent statement by Deputy CIA Director Admiral B.R. Inman that a growing leakage of strategic technology through American scientific publications will lead to some form of scientific censorship, either voluntary and self-imposed or mandated by the government.

Saying the openness of American science is not a security threat, but is rather the source of strong American technology, Rosenzweig called the U.S. a risk-taking society. "It has always seemed risky to run an open society; perhaps that is why there are so few of them," he said.

As Stanford vice-president, Rosenzweig is well versed in arguments of academic freedom vs. national security. The university recently carried on a running battle with the State Department over government insistence that Stanford limit access to its research programs by a visiting Soviet roboticist.

"If work going on at Stanford was judged to be too sensitive to be exposed to a Russian visitor," he explained, "then the solution is to keep him away from the university, not to ask the university to play policeman."

Too Burdensome

Turning to what he called the "seductive notion" that academicians can police themselves by voluntary prepublication screening of research results to keep findings with potential military applications out of circulation, Rosenzweig said such arrangements are too administratively burdensome to be extended to any but the most limited areas of science and technology.

Arguing for continued scientific openness, he listed five reasons the U.S. has been able to maintain its technological edge in the world "in spite of energetic and determined competition":

• "We have an economic system that rewards and therefore encourages risk taking," according to Rosenwzweig, who said that, conversely, centrally directed, highly bureaucratized economies are "risk adverse."

• The U.S. educational system allows talented people to go as far as their talents will take them. Widespread financial aid to American students has produced a "pool of talent . . . far larger than elsewhere in the world," he said.

• In the U.S., higher education is traditionally linked to societal requirements. "There is nothing analogous to this phenomenon elsewhere," according to Rosenzweig, who noted "the importance of the link between such universities as MIT and Stanford and the electronics and computing industries."

• "In this country we link fundamental research and research training. They are done in the same place — universities — and by the same people — faculty and graduate students," he said. This, he explained, links the best young minds with the most experienced teachers and practitioners.

• The U.S. scientific structure "puts a high value on the free communication of scientific results." As a result, he said, good people are quickly recognized and good research findings can be quickly tested and used as the basis for further research.

"If there were no other justification for maintaining the traditional openness of our scientific work, it could be justified on the grounds of its value as an economizing device alone," Rosenzwieg said.

He argued it is not the quality of American science but its openness that produces the U.S. technological advantage.

"Any solution to the problem of technology leakage that does not take into account these elements of our strength, any solution that does damage to the sources of our strength, will produce results far worse than the problems it purports to solve," he said.

GTE Challenges AT&T With Private-Line Service

STAMFORD, Conn. — An end-to-end, all-digital private-line service that reportedly will cost users 30% less than AT&T charges has been announced by GTE Satellite Corp., headquartered here.

"We plan to begin service in November through earth stations near New York, Chicago, Houston and Los Angeles," a GTE spokesman said. The proposed monthly rates are:

• New York-Chicago, Houston-Chicago — $600 for 4,800 or 9,600 bit/sec service, $3,000 for 56K bit/sec service.

• New York-Los Angeles — $1,200 for 4,800 or 9,600 bit/sec, $4,000 for 56K bit/sec.

• For the remaining three city pairs — $900 for 4,800 or 9,600 bit/sec, $3,500 for 56K bit/sec.

In addition to these charges, there will be a one-time installation charge and a recurring monthly local loop charge. Tentatively, these have been set at $100 each, the spokesman said.

An unusual feature of the GTE offering will be use of two-way cable TV local access facilities in at least some cities. Discussions are under way with Manhattan Cable Co. in New York City, Warner Amex Communications in Houston and unnamed cable network operators in Los Angeles, the spokesman said.

The GTE service will be accessible to data communications customers only through leased lines. No dial-up connections are planned except for foreign exchange extensions, he added.

The network was designed primarily to provide point-to-point service and will accommodate "any" synchronous or asynchronous protocol, according to the spokesman.

Protocol conversion is planned later as one step in the metamorphosis by 1984 of the new offering into an Integrated Services Digital Network.

Initially, GTE plans to use the Satellite Business Systems network to support its projected service. A tariff will be submitted to the Federal Communications Commission "by mid-year," the spokesman said.

Say Offering Not 'Basic'

Six Rivals Object to BPSS

WASHINGTON, D.C. — More objections to AT&T's proposed Advanced Communications Service (ACS) surfaced at the Federal Communications Commission (FCC) late last month.

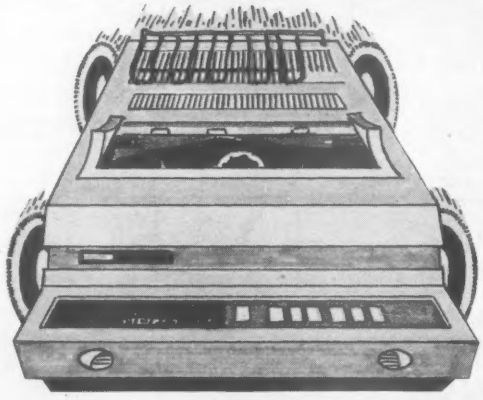
As proposed by the phone company, ACS will consist of two basic components: A series of nodes — to be operated by a deregulated subsidiary — that packetize/depacketize and perform other "enhanced" operations on customer-generated data signals; and a "basic" network that handles message transport functions (error and flow controls) and interconnects the enhanced service nodes.

This basic network, the Bell Packet-Switched Service (BPSS), which would be a regulated offering of AT&T's Long Lines Division, was the subject of an AT&T tariff filed about a month ago [CW, March 8]. The latest development is that six prospective ACS competitors have objected to BPSS.

One of their key contentions is that the offering is not "basic" according to how that term was defined by the FCC in its Second Computer Inquiry Decision. According to GTE Telenet Communications Corp., one of the BPSS critics, the commission defined a basic service as "the offering of transmission capacity between two or more points."

Furthermore, GTE Telenet said, the definition of a basic service requires that "the logical network access protocol, procedure and formats at both ends of the communications path must be the same." The company argued that since the BPSS tariff encompasses only nodal facilities and not circuits, it is not a transmission service and therefore not basic.

The phone company is expected to reply to the objections within the next few weeks.



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Inman Promises to Show How Data Aids USSR

(Continued from Page 1)

ing militarily useful information from American scientific publications. The data will also show, he said, the "massive Soviet effort" to obtain strategic Western technology from a variety of sources.

But Rep. Albert Gore Jr. (D-Tenn.), chairman of the House Science and Technology Subcommittee on Investigations and Oversight, told Inman that as a member of the House intelligence committee he has pursued the classified version of the information to which the admiral referred. "I have carefully reviewed the evidence," Gore said, predicting the information would "fall short of the so-called 'tidal wave' " of technology leakage to which Inman referred.

Gore expressed concern that Inman's remarks to the AAAS constituted a veiled threat to government censorship and as such "begins to cross a line that the government should approach very cautiously."

Backpedaling from his January statement in the face of pointed questioning from Gore and other subcommittee members, Inman said the technology leakage from scientific publications is at this time minimal. He also protested that his speech was made from the standpoint of a "knowledgeable citizen" and did not necessarily represent the views or policies of the Reagan administration.

Another witness last week, however, remarked that Inman, as former director of the National Security Agency and the current No. 2 man at the CIA, cannot speak as just a private citizen on matters concerning intelligence and national security. "You are your role," said Dr. Robert M. Rosenzweig, Stanford University vice-president for public affairs.

Rosenzweig said that any attempt to restrict the open exchange of scientific information would threaten the very source of American scientific and technological success.

On that same point, Gore told Inman that the subcommittee wants to make the intelligence agencies "more aware of the importance the American people place on academic freedom." Any move to engender in the academic community a fear of government censorship will lead the U.S. down the road to the type of closed scientific establishment that has made Soviet science so "pitiful." Inman said that scientific publications are "a very small portion of the [leakage] problem," but predicted that as the U.S. becomes more successful in fighting the larger problem of Soviet technology espionage, the Russians will turn increasingly to publicly available data. At that point, he said, congressional and public opinion could lead to a mandated review process for scientific papers unless the academic community is prepared with its own ideas to counter the technology transfer problems.

"The intelligence community will have essentially no role in writing regulations," according to Inman, who said that the departments of State, Commerce and Defense may become involved in this issue in the next year or two when the full extent of Soviet activity "comes to the fore."

He said that the recently established review process for cryptography papers is an example of what the academic community can do on its own to counter the problems when made aware of the situation. Other witnesses at the hearing, however, argued that the cryptography review mechanism is controversial in academia, was instigated by the government and not by scientists and was accepted only on the basis of unsubstantiated claims by the intelligence community — who said the supporting data was classified — that there is a problem of technology leakage in that area.

Extending the process to other types of technology, such as computer hardware and software, as Inman suggested in January, would pose "an administrative problem of very significant dimensions," according to Rosenzweig.

Calling the process "a very cumbersome arrangement," Rosenzweig said, "It's an interesting experiment . . . But I think it's a mistake to overlearn from it and to extend it prematurely to any broader areas of science and technology."

Panel to Probe Research Role

WASHINGTON, D.C. — The National Academy of Sciences has established a panel to examine the relationship between university research and national security. Several areas of electronics will be targeted in the study.

The year-long investigation is the result, the academy said last week, "of the growing concern that foreign nations are gaining military advantages from American research."

An interim report by the 18-member panel will be issued in September, with the final report due next March. Dale R. Corson, a physicist and president emeritus of Cornell University, will chair the panel, whose members have expertise in scientific research, university administration, national security programs, research and development management, international trade regulation and control and legal issues.

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Jury Finds Burroughs Guilty in B700 User Suit

(Continued from Page 1)

vendor guilty of inflicting $100,000 in damage, but also decided that since the defendant did not deliberately intend to injure Nelson by the computer's sale and was not grossly negligent, Nelson will not be allowed to recover this amount.

Although no decision had been made at press time, Nelson — which filed a multimillion-dollar punitive damages claim — may decide to appeal the jury's ruling in favor of Burroughs on the liability issue, sources said.

Nelson bought its B700 system in March 1977 and filed suit against Burroughs in January 1981 because the system and its software never performed as promised, Longley said. At the time of sale, Burroughs not only allegedly claimed that the B700 could handle more jobs than it actually could, but said that necessary software modifications would not create any significant problems.

The software modifications were a crucial factor in Nelson Specialty's suit since attempts at modification "really messed up the applications software," Longley said. Although Burroughs was not directly involved in the modification of the system's software, the modifications were made by Thomas Lanham, a former Burroughs salesman based here in Austin who was recommended by the vendor, he added.

Longley attributed Nelson Specialty's victory over Burroughs to a number of documents that surfaced during pretrial discovery. Volumes of "very critical documents" were turned over to Nelson's lawyers at the request of Clark. Included in the material were internal Burroughs memos, detailed descriptions of problems other users had had with the B700 and statements relating to the vendor's policies on disclosing information on allegedly defective computer equipment.

"If other cases could get the documentation that we got, I think that Burroughs would obviously have some problems," Longley observed.

Little Impact Seen on Other Suits

While the decision in favor of the Nelson Specialty Supply Co. in a case involving an allegedly defective Burroughs Corp. B700 minicomputer may be encouraging to the more than 150 other users who have filed suits against Burroughs, chances are slim that it will have much of an impact on pending litigation.

Particularly since the decision has its roots so firmly implanted in "those crazy laws in Texas," Peter Vogel, an attorney and computer law expert, said last week.

Vogel and attorney Thomas L. Stephan are currently representing another user in a suit against Burroughs, this one involving a B800 system. That suit went to trial last week in Twin Falls, Idaho.

The decision for Nelson Specialty is "one of those things that is a crack in the dam, and I don't know if it's really going to make a big hole in the dam and really get things going," Vogel explained.

Although Burroughs was found guilty of fraud and misrepresentation in the Nelson Specialty suit, the case was decided in the shadow of the Texas Deceptive Trade Practices Act. The decision has no impact on claims of fraud, misrepresentation or breach of contract made by other Burroughs computer users outside the borders of Texas, Vogel said.

However, the fact that documentation uncovered during pretrial discovery weighed so heavily in Nelson's favor is encouraging to other disgruntled users that are preparing for their day in court with Burroughs. Vogel and Stephan are incorporating a great deal of similar internal documentation into the Idaho trial, which involves a machine parts distributor called Century Automotive Machines, Inc.

Century Automotive was one of the first users to buy a B800 from Burroughs and was the first to file a suit claiming fraud and misrepresentation.

Researcher Sees Computers In Role of Strikebreaker

(Continued from Page 1)

"On the one hand," he wrote, "computer technology and telecommunications make possible central direction of far-reaching activities, concentrating enormous power into relatively few hands.

"On the other hand," he wrote, "complex computer systems often lend themselves to operation by a reduced and less skilled work force in an emergency situation." One must then ask just how safe and effective a reduced air traffic control work force really is.

Very Heavy Gamble

"The air traffic control system is the most difficult place to make that case [of operation by a reduced work force]," Shaiken explained in the interview. "I chose to raise it there because I think it was an important aspect of the dispute, but there's no question in my mind that the FAA and the government took a very heavy gamble in proceeding along these lines.

"I think that the arguments concerning safety and the margin of safety that Patco raised in the early parts of the strike were valid arguments and are still valid arguments," he continued.

"The fact that an accident didn't occur is a tribute to a lot of things, but I think there's no question that the margin of safety was seriously eroded by removing that many experienced people from the system," he said.

Shaiken's article asked: "On balance, do computers make management more vulnerable to disruption or do they put workers at the mercy of technological strikebreaking?"

His answer: It depends on "the nature of the industry, the way the technology is designed and the strategies workers and managers pursue in a given situation. Of particular importance is the level of unionization and the degree of cooperation among unions."

Strikes Still Effective Weapon Despite Computers, Shaiken Says

CAMBRIDGE, Mass. — In the face of "strikebreaking" computer technology, is the good old-fashioned strike action finished as labor's ultimate weapon?

Not according to MIT labor relations expert Harley Shaiken. "But it means that unions will require broader strategies and more technical sophistication to effectively use the strike as a weapon in the future," he wrote in the April issue of *Technology Review*.

"The real leverage a union has in a strike situation is its ability to withdraw labor in a way that disrupts production," Shaiken explained in a recent interview.

In the case of the Professional Air Traffic Controllers Organization (Patco) last summer (see story on Page 1), "for a variety of factors, including computer control, the government was able to keep the system running although most Patco members had withdrawn their labor."

Look for Leverage

"In order to deal with that kind of a situation, the union has to look at other vulnerable points where there might be leverage," he explained.

"If the pilots had been supportive of Patco, there would have been considerable leverage regardless of the Federal Aviation Administration's automated [air traffic] flow control system.

"That means an understanding of the power of computer technology prior to a strike situation would lead a union to look at those points where very real leverage still exists and that's usually in other surrounding and related occupations," Shaiken said.

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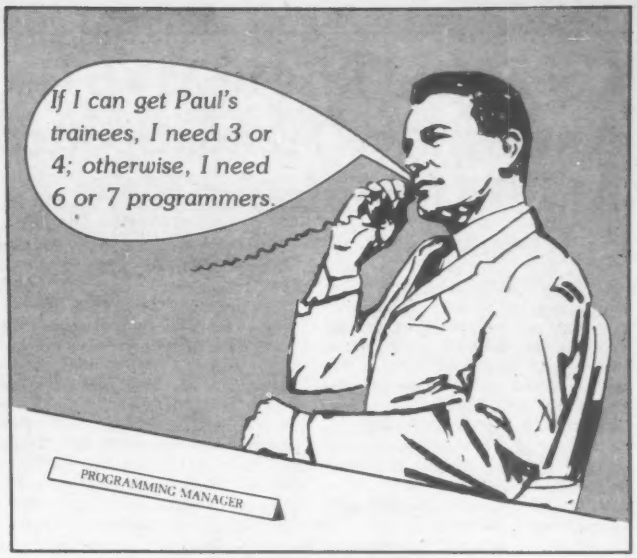

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Continued Rise in MVS Use Among Five Trends Spotted At IBM Mainframe Sites

By Lois Paul
CW Staff

FRAMINGHAM, Mass. — Continued growth in the use of IBM's MVS operating system was one of five major trends spotted in a recent survey of 888 IBM mainframe sites nationwide published by International Data Corp. (IDC) here.

The survey also indicated that:

- The use of data base management systems (DBMS) is still increasing among IBM mainframe users.
- IBM's CICS remains the preferred teleprocessing monitor.
- The use of in-house time-sharing systems is increasing.
- On-line editors and/or checkout systems for program development are widely used.

Entitled *IBM Software Environment*, the IDC report analyzes the software used on 1,138 IBM 360, 370, 30 series and 4300 systems at the end of 1981 by family, model and total IBM-installed base. It also includes information on software that users intend to acquire by the end of 1982.

At the end of 1981, 21% of all the CPUs in the survey were running the MVS operating system, the survey reported. Two years ago, this figure stood at 14.4%. Similarly, an increased number (17%) of shops were installing IBM's VM/370 system control program. This compares to 9% reported two years ago.

In terms of operating system upgrades planned by users for 1982, IDC reported that large numbers of DOS/VS and DOS users intend to move to DOS/VSE; DOS/VSE shops acquiring different operating software on replacement CPUs almost exclusively planned to move to VM/370; and MVS will supplant just about half the OS/VS1 and OS/MVT software being replaced. In addition, 23% of the VM/370 systems targeted for replacement are going to become new MVS sites.

IDC projected accelerated growth in the DBMS sector throughout the 1980s, both in terms of revenue and new product development. More than 47% of the machines surveyed (50% of the sites) were using DBMS software at the end of 1981. Two years ago, this figure was 38%. Of the sites running a DBMS, 58% had chosen an IBM product. The surveyers noted this is a 5% drop since 1979.

"For all its bells and whistles, IMS was chosen by 17% of the shops using a DBMS package. DL/1 was used by 40% of the machines running such software. Each of these figures is higher than the ones attributed to any of the independent suppliers," the report said.

DBMS Figures

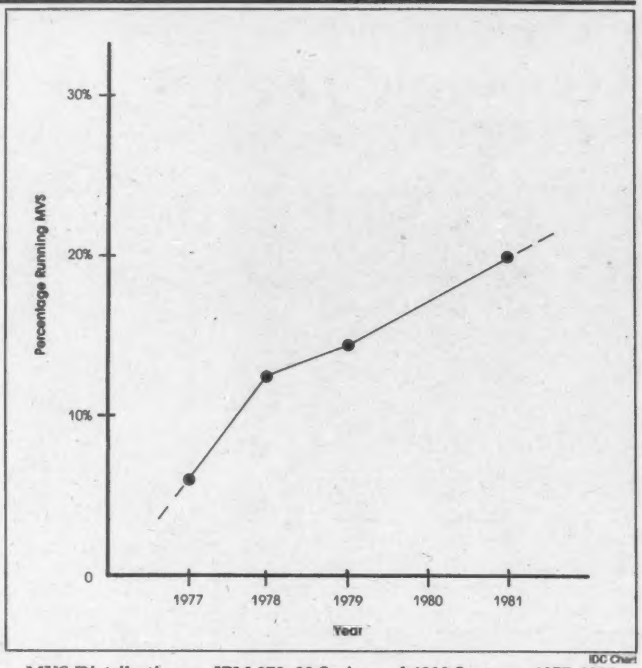
Cincom Systems, Inc.'s Total DBMS proved to be the most popular independent package running on IBM mainframes, according to IDC, but its share has declined from 17% in 1979 to 14% in 1981.

The survey responses indicated that at the end of 1981, 92% (as compared with 87% in 1979) of the DBMS packages installed on IBM mainframes were making use of a teleprocessing monitor. Of this group, 74% preferred IBM's CICS. In addition, CICS reportedly was the most popular monitor used on each DBMS product surveyed, except Applied Data Research, Inc.'s (ADR) Datacom/DB for which the users preferred ADR's own Datacom/DC.

IDC also found that 66% of all the mainframes surveyed were using an in-house time-sharing system to perform tasks such as allocating hardware resources, scheduling user tasks and I/O coordination. This is contrasted with 33% of the sample surveyed two years ago. IBM's ICCF proved to be the most popular product (47%) in use for in-house time-sharing. TSO, the most frequently cited program two years ago, seemed to have lost much of its attraction.

On-line editors and/or checkout systems for program development are being used by about 73% of the sites polled by IDC, an increase of 21% over the 1979 results. IBM's ICCF was preferred by users at 45.7% of all the sites analyzed, whereas two years ago, ICCF usage lagged behind that reported for TSO.

The 135-page *IBM Software Environment* report includes information obtained from IDC's October 1981 annual IBM Migration Census/Study of 17,000 sites across the country. It is available for $3,000 from IDC at 5 Speen St., Framingham, Mass. 01701.



MVS Distribution on IBM 370, 30 Series and 4300 Systems, 1977-1981

ICP Honors 342 Software Products

(Continued from Page 1)

often the most exciting milestone for vendors is the $1 million award. This year ICP gave out 208 $1 million awards, up 58% from the 132 products that received that honor last year.

Moreover, 16 products received the Million-in-One-Award for $1 million in sales for a specific product in a single year.

Since the inception of the awards, 808 products have reached the $1 million level, with this year's first-time winners making up just over 25% of the total number of products receiving awards in the past 11 years.

While no company reached the $100 million pinnacle last year, two companies received the award this year — Management Science America, Inc. (MSA) for its MSA Human Resource System and Informatics, Inc. for its Mark IV product.

At the $50 million level the winners were Applied Data Research, Inc. for The Librarian; Informatics for Life-Comm; Intel Corp. for System 2000; Mathematica Products Group, Inc. for Ramis II; Pansophic Systems, Inc. for Easytrieve; and Policy Management Systems Corp. for Policy Management System.

This year ICP combined its $20 million and $30 million prizes into a new $25 million category and awarded 28 prizes for that sales achievement. In addition, 41 products won $10 million awards, up from the 31 systems achieving that distinction last year.

In addition, 56 products walked away with $5 million awards, compared with 55 product awards given last year.

Besides the product awards, ICP also gave out 130 Super Software Seller awards to individual sales representatives and 32 promotional achievement awards.

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And 3270 BSC Support

Honeywell DSA Gains X.21, X.25 Interfaces

By Bruce Hoard
CW Staff

MINNEAPOLIS — The second release of Honeywell, Inc.'s Distributed Systems Architecture (DSA), unveiled last week, provides X.25 and X.21 interfaces to public data networks as well as support for IBM 3270-type terminals running under the Binary Synchronous Communications (BSC) protocol.

The release also is said to include extended configuration possibilities on the Datanet 8 Network Processor. That device, which can be used as a front end, a network switch or remote concentrator, can now contain 1.5M bytes of memory.

DSA is an element of Honeywell's Distributed Systems Environment, the overall distributed processing framework within which the company's products function cooperatively.

In addition to 3270 BSC support, DSA also was enhanced to support IBM 2780-type foreign processors, satellite processors using Polled VIP Emulation, Remote Computer Interface and Logical High-Level Data Link Control and Honeywell VIP7804 and VIP7805 terminals. Local connection (without modems) of VIP7300 asynchronous terminals has been extended to 4,000 ft (1,219 meters) by support of the RS-422A interface.

The architecture gained support for the X.25 and X.21 packet- and circuit-switched networks through its compatability with the International Standards Organization reference model for Open Systems Interconnection.

DSA now reportedly supports the following public data networks, value-added networks and private data networks based on the International Telephone and Telegraph Consultative Committee standards: Telenet and Tymnet (U.S.), Datapac (Canada), Datex-P (West Germany, Austria), DDX-P (Japan), DN 1 (The Netherlands), Euronet (European Economic Community), PSS (UK), EDWP (Switzerland) and Transpac (France).

The second release also provides for automatic backup links between network nodes. Other network administration and control features include cross-net loading and dumping of Datanet 8 network processors and control and administration of the network via remote console.

Several new or approved software functions were added to DSA. For example, in addition to satellite-to-host file transfer, DSA now permits file transfer between host systems (DPS 8, 66/DPS, DPS 7 and 64/DPS) and between satellite systems.

Furthermore, remote job entry (RJE) can occur between medium-scale hosts, and two-level cooperative transaction processing support between a Honeywell Distributed System Satellite (DSS) and a large or medium-scale host is available.

A DSS can be connected to two host systems for various forms of distributed processing: terminal concentration, file transfer, RJE and document distribution.

The minimum price for one Datanet 8 with eight lines and a 30 char./sec printer is $39,000 for purchase or $1,212/mo on a five-year lease plan. There is also a monthly maintenance fee of $229.

The distributed network supervisor software for the Datanet 8 in a minimum configuration costs $760/mo.

The yearly license fee of DSS software for a site that already has a DPS-6 is a minimum of $852.

Information on other DSA pricing is available from Honeywell at 200 Smith St., Waltham, Mass. 02154.

Study: FAA Plan Must Target Work Relations

WASHINGTON, D.C. — The Federal Aviation Administration's (FAA) recently announced 20-year equipment and facilities plan is technically excellent, but must be accompanied by better management/employee relations if it is to succeed, according to an independent study just completed for the FAA.

The study, initiated by the FAA following last year's walkout of 11,400 air traffic controllers, pointed to long-time agency management problems as a major factor in the strike. The report found 20 years of "rigid and insensitive ... people management within the FAA."

Nonstriking controllers and supervisors have pulled together to see the agency through the present manpower crisis, but this widespread esprit de corps will disintegrate unless overall changes are made in FAA management, according to the study.

Discussing the $9 billion plan to upgrade air traffic control computers, radar and facilities [CW, Feb. 8], the report said it "should be adopted as both technically superior and advantageous to improved working relationships."

But, the study continued, as important as it is for the plan to be correct technically, "it is even more important that changes impacting people be identified and planned in such a way that the technical and structural revisions are handled knowledgeably and with confidence and enthusiasm."

The study found increasing FAA automation over the years, "with attendant hardware and software problems," contributed to the management/employee friction that culminated in the Aug. 3 strike by members of the Professional Air Traffic Controllers Organization.

Of the bitter labor dispute that led up to the strike, the report said the systems problems were just one of many factors that "taken together ... appear to indicate that morale within the Air Traffic and Airways Facilities divisions of the FAA is not good. It is, in fact, very poor."

Controllers moving into the management ranks have too often carried with them the "linear thinking" that served them so well in handling air traffic. The result, the report said, was that supervisors have tried to "vector people as they did airplanes. It doesn't work well."

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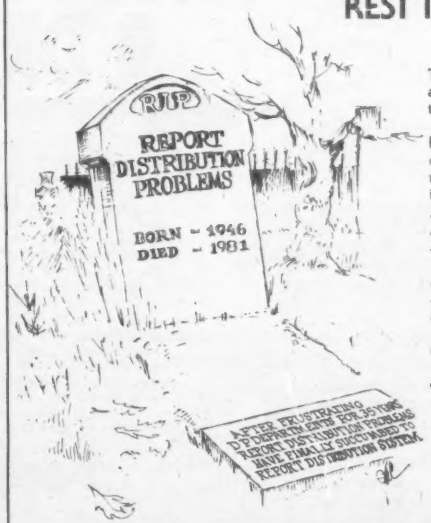

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AT&T Fighting on Three Fronts

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Capitol Hill is just one of three battlefronts in the continuing war between AT&T and its competitors over national telecommunications policy.

Another is in U.S. District Court here, where Judge Harold Greene is presiding over the government's dormant but still-pending antitrust suit against Bell; the third is in the U.S. Court of Appeals, District of Columbia Circuit, where the Federal Communications Commission's (FCC) Second Computer Inquiry Decision is on trial.

In the U.S. vs. AT&T case, interested parties must submit comments by April 20 to Greene on the proposed consent decree that AT&T and Department of Justice attorneys signed in January to settle the antitrust suit.

The Department of Justice will analyze these comments and submit a report to Greene in early May, after which he will decide whether to accept the agreement.

How long Greene will take to make that decision is anyone's guess, but the most popular estimate is three months — by early July.

There is a good chance the appeals court will decide what to do with the FCC's Computer Inquiry II decision by then.

The genesis of this proceeding goes back more than a decade to an effort by the FCC to determine how it should regulate the growing convergence between computers and communications.

The Computer II decision is actually a series of rulings that the commission issued between April 1979 and last October.

Unregulated Basis

The key provision allows AT&T to offer terminal equipment and enhanced (computer-based) services on an unregulated basis through a separate subsidiary. This effectively cancels a 1956 consent decree limiting the phone company to common carrier communications services.

The Computer II decision was appealed to the Washington, D.C., court by several AT&T competitors — prospective and actual — led by the Computer and Communications Industry Association (CCIA).

A three-judge panel heard oral arguments late last month and is now considering whether to remand or accept the FCC's ruling.

A key argument is whether the commission exceeded the policymaking authority that Congress granted to it in the Communications Act of 1934.

Another is whether the decision will promote the public interest by allowing AT&T to enter the information services and terminal marketplaces on a deregulated basis.

On the first point, CCIA attorney John Chapman, during the recent oral argument before the appeals court, accused the commission of "conscious lawlessness" and "administrative authoritarianism."

On the second, attorney Herbert Marks, representing the Independent Data Communications Manufacturers Association, Motorola, Inc. and the burglar alarm industry, said the commission's separation of regulated from unregulated activities is incomplete because it separates only retail marketing of services and terminal equipment while allowing the two sides of the new AT&T to utilize common manufacturing, maintenance, research and development and administrative facilities.

As a result, Marks said, the decision will expand AT&T's present monopoly instead of achieving the FCC's stated purpose of promoting the public interest by increasing competition.

The commission's answer is basically that it has "ancillary powers" under the 1934 act, separate from those allowing it to control common carriers, which it can use if necessary to curb anticompetitive activities of AT&T's deregulated separate subsidiary.

The commission also insists that further structural separation is not necessary because competition will prevent surreptitious cross-subsidies and other abuses.

Short Version Of H.R. 5158 Seen In Works

By Brad Schultz
CW New York Bureau

PORT CHESTER, N.Y. — A shortened version of H.R. 5158 — the bill to revise the 1934 Communications Act — may be proposed soon in the House of Representatives, a House subcommittee's chief economist told a conference here last week.

If the House does not pass H.R. 5158 by this summer, the economist declared, an abbreviated version that would resolve rate payer and national defense issues may shortly thereafter become law without resolving issues of deregulation.

A third alternative — besides passage of H.R. 5158 or a "short bill" — would be passage of no bill at all to change legislation written a half-century ago to specify federal controls on the telecommunications industry.

So said Walter J. Bolter, chief economist of the House Telecommunications Subcommittee, at the Information Utilities '82 conference sponsored by Online, Inc. Bolter expressed hope that the House will pass H.R. 5158 by this summer, but noted that differences between that bill and a counterpart Senate bill may linger beyond that time, reflecting the complexity of AT&T's recent agreement to divest itself of all Bell operating companies.

If such a bill does not emerge from a joint committee of representatives and senators, convened to iron out differences between the chambers, exasperated legislators may reject the idea of pushing through a bill that would merely settle issues of immediate concern to consumers.

The short bill might, therefore, address fears that AT&T's divestiture of the Bell operating companies will lead to skyrocketing bills for users.

The short bill could also spell out a plan to divest the Bell operating companies without compromising national security, Bolter maintained.

During its long battle with the Justice Department, AT&T has argued that national security would be jeopardized if certain strategies for regulating or forcing the breakup of AT&T were enacted.

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Passage of H.R. 5158 in '82 Seen More Likely

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The passage this year of a House of Representatives bill rewriting the Communications Act of 1934 is appearing considerably more likely since the Telecommunications Subcommittee unanimously approved H.R. 5158.

A knowledgeable source who earlier doubted the rewrite bill could get to the floor of the House before it adjourned [CW, Feb. 22] said he is now "much more optimistic." He attributed his optimism partly to the unanimous vote, but mainly to an endorsement of H.R. 5158 by Rep. James Broyhill (R-N.C.), the ranking Republican on the House Commerce Committee, which considers the bill next.

While Broyhill's support improves the bill's chances for passage, it still faces strong opposition:

• AT&T has launched a major lobbying campaign against H.R. 5158 that reportedly involves the expenditure of up to $2 million. The company is asking its 1 million employees and 3 million shareholders to write their legislators expressing opposition to the bill.

• Sen. Barry Goldwater Sr. (R-Ariz.) — who as chairman of the Senate Commerce Committee's Communications Subcommittee will have much to say about whether Congress enacts a new national telecommunications policy — has made it clear he opposes H.R. 5158. And there may be some defections from the ranks of the bill's supporters.

• The North American Telephone Association, which represents "interconnect" manufacturers (the non-Bell companies that make and distribute telephones, private branch exchanges and related equipment) is unhappy about one provision of H.R. 5158 that would allow Bell operating companies to market new terminal equipment through separate subsidiaries five years after the enactment of H.R. 5158. An association spokesman indicated the group will actively oppose the bill if this five-year delay is removed — a change that appears likely.

Opponents of H.R. 5158 argue that further action on the bill should be delayed until Judge Harold Greene, who presides over the adjourned, but still pending U.S. vs. AT&T antitrust suit, decides whether to accept the proposed settlement negotiated last January. Since the settlement does not cover many of the areas addressed in the legislation, the real issue is not timing but the extent to which AT&T should be regulated.

The phone company appears particularly upset, for example, about a provision added to H.R. 5158 during the final markup session which would require conversion of AT&T's Long Lines Division into a separate subsidiary. By comparison, the agreement reached by AT&T and Justice last January restructures only the Bell operating companies.

Key Points Of H.R. 5158

WASHINGTON, D.C. — Besides requiring conversion of AT&T's Long Lines Division into a separate subsidiary, the version of H.R. 5158 that was recently passed by the House of Representatives Telecommunications Subcommittee contains the following key provisions:

• Deregulation of a carrier or transmission service would require a finding by the Federal Communications Commission (FCC) that "adequate" alternatives exist. To be adequate, the alternatives would have to satisfy specified criteria.

• All carriers would have to interconnect their facilities on nondiscriminatory terms with any transmission facility, service or terminal equipment upon reasonable request.

• Most intercity toll facilities would come under the FCC's jurisdiction after a five-year transition period.

• Carriers offering enhanced services would have to unbundle them — price each component of the offering separately.

• State regulatory agencies would retain authority over electronic transmission provided within a local-exchange area.

• The FCC would retain authority to set interconnection and related transmission standards, but it could not standardize the internal operation of terminals, including computers.

• Already installed inside wiring and terminal equipment would stay under tariff until fully depreciated or auctioned off, subject to policies set by state public utilities commissions.

The same rule would apply to wiring/terminal installations made within two years after enactment of H.R. 5158. After that date, both items would be deregulated.

• A new system of access charges will be established to replace the present separation/settlement process.

• Long Lines and other Bell affiliates would be forbidden to participate in domestic joint ventures, but they would be allowed to cooperate in international activities.

• All patents acquired by AT&T before 1984 must be licensed to the public on reasonable terms. Patents related to interconnection must be licensed indefinitely.

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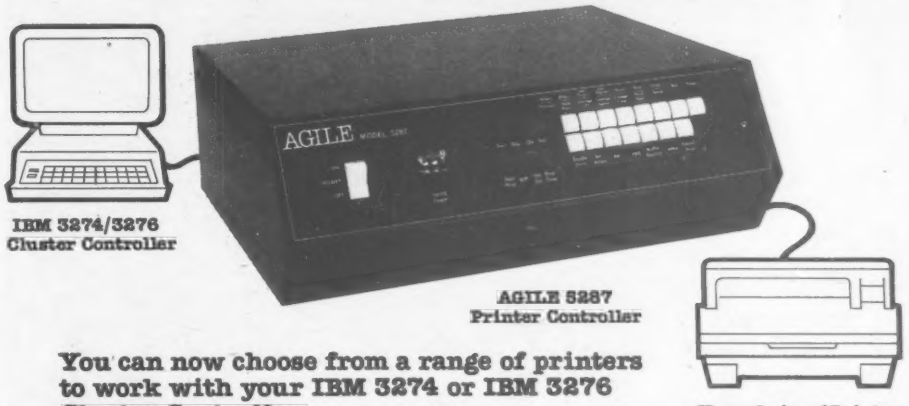

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ICCG Founded To Help Users

PHOENIX — Two management consulting firms have joined forces to help users select computer equipment and to settle disputes between computer users and vendors.

The Independent Computer Consultants' Group (ICCG) was cofounded by Business Automation Associates, Inc. here and Dunlop and Olason, Inc. of Seattle. The group is seeking members to pool information and combat negligent vendors.

"So many businesses are being ripped off by the computer companies, we joined forces to fight back," Mike Dunlop, president of Dunlop and Olason, said.

ICCG can be contacted at 714 E. Tuckey Lane, Phoenix, Ariz. 85014.

Course Covers Communication

BETHESDA, Md. — "DP Communication Skills Workshop" is the name of a two-day in-house course being offered by the Gary Slaughter Corp. (GSC).

The program emphasizes the need for DP professionals to communicate more effectively in order to improve people productivity. Participants will practice converting unproductive or unpleasant instructions or interactions into productive ones.

The course is available for $5,000 to in-house groups not exceeding 24 people, according to GSC at 4810 Montgomery Lane, Bethesda, Md. 20014.

Research on Cyberphiliacs, Cyberphobiacs Reveals 30% Of Workers Fear Computers

By Lois Paul
CW Staff

PHILADELPHIA — Computers can have strange effects on some people — they either love them so much that they cannot stop programming or they hate working with them enough to quit their jobs.

At least this is what Prof. Sanford Weinberg, a professor and administrator at St. Joseph's University here, is finding. Weinberg has been conducting research regarding cyberphiliacs (compulsive computer programmers) and cyberphobiacs (people who fear computers) since 1979.

At least 30% of the business community that deals with computers on a daily basis experiences some degree of cyberphobia, Weinberg said. Very often these are people who opted for nontechnical jobs, such as secretarial work or teaching, and who find themselves unwittingly thrust into an automated environment.

Fear of computers is a phobia, according to Weinberg, when it keeps people from functioning normally. The sufferers experience the same symptoms as those suffering from other phobias — nausea, sweaty palms and high blood pressure.

Weinberg has described an incident in which a policeman developed such a complex about the computer console in his police car that he shot it. Another sufferer attempted to thwart his enemy, the computer, by dumping pencil shavings and coffee into the console.

Treating the Phobia

"One of the major causes of the phobia is the feeling that you have lost control," Weinberg explained. Part of the treatment, therefore, is information about how the system works and what it can do.

It would seem that the proliferation of computers, particularly microcomputers, would lead to an increased level of computer literacy and, therefore, a reduction in cyberphobia. Weinberg said this is not the case. "Most people probably aren't getting educated about the problem," he said, adding that the computer education in high schools and colleges simply is inadequate. This also is reflected in the fact that young people, as well as older people, are suffering from this problem. He predicted that the numbers of people experiencing this fear of computers will increase as society becomes more and more computerized.

Weinberg pointed to the release of hardware and software products before they really are ready as a probable cause of the frustrations and "bad experiences" that create cyberphobiacs. He said that the way the marketplace works in the computer industry almost forces this release of products before they are perfect.

The other condition, the semiaddiction to computers, does not force people to switch jobs to try to avoid exposure to technology. As Weinberg described cyberphilia, it has the opposite effect of drawing people into programming to the exclusion of almost all other interpersonal relationships. "People I have talked to generally have no friends and are not married."

Whereas he has conducted workshops on cyberphobia for some large companies, the problem of cyberphilia has not attracted the same interest in a "cure." Weinberg explains this by noting that these compulsive programmers are not causing any problems in their firms. These "superprogrammers" are popular employees from a performance standpoint.

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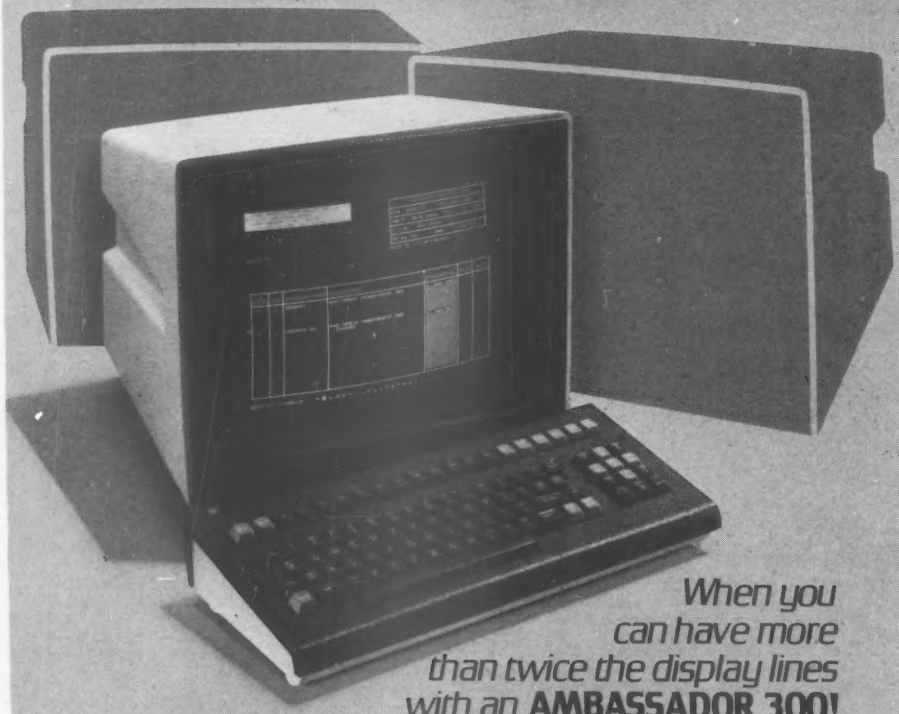

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Claims Price $2 Million Too High

Vendor Challenges Minnesota Bid Award

By Jim Bartimo
CW Staff

ST. PAUL, Minn. — Minnesota taxpayers will overpay at least $1.9 million for remote teleprocessing equipment and maintenance because of a bid awarded to IBM and a local distributor, Tele-Terminals, Inc., according to a legal complaint filed against the state by a competing vendor, Telex Computer Products, Inc.

Telex asked for an injunction prohibiting the state from entering into the IBM/Tele-Terminals agreement, which will allow Tele-Terminals to buy back the equipment after five years for 1% of its purchase value.

"The Tele-Terminals/IBM bid is a lease/purchase agreement which requires that Minnesota purchase the equipment directly from IBM," the complaint states.

Three Options

"The bid specifies that at the end of five years, Minnesota must elect one of three options:

- Sell the equipment to Tele-Terminals for 1% of the original purchase value.
- Purchase the equipment from Tele-Terminals for 35% of the original purchase value.
- Lease the equipment from Tele-Terminals for a minimum term of three years," the complaint said.

"What we have here," said the author of the complaint, Thomas M. Smith, district marketing manager for Telex, "is a contract from IBM over a five-year period. At the end of that time, Tele-Terminals owns it [the equipment] and can repossess it from the state. I can't imagine why anyone would enter into an agreement like that."

Jim McLeary, president of Tele-Terminals, which has held the state contract since 1978, said that his company has not taken a sales commission or profit on the sale of the IBM equipment. It will only perform the maintenance on the state's equipment.

Tele-Terminals hopes to make a profit when the five-year contract expires, allowing it to buy back the equipment for 1% of purchase value. But "if IBM introduces a new line of terminals and equipment, we won't buy the equipment back because it will be worthless," McLeary said. "The state will be able to keep the equipment."

The commissioner of the Minnesota Department of Administration, James J. Hiniker Jr., against whom the complaint was filed, said he will make no comment on the legal action unless it results in an injunction to stop the signing of the contract.

The verified complaint, filed in the County of Ramsey District Court on March 25, allows the Minnesota Department of Administration 20 days to justify the rejection of Telex's bid, according to Smith. If the state does not show that the awarding of the bid to IBM and Tele-Terminals was justified, an injunction will be issued to stop the signing of the contract.

In the complaint, Smith also alleged that Hiniker mistakenly added at least $614,376 to the Telex bid, making it appear higher that the Tele-Terminals bid when it is, in fact, $537,136 less.

The claim also states that, under the Telex bid, the state would own the equipment after the five years. "When the cost to Minnesota of retaining title to the equipment at the end of five years is added to the Tele-Terminals/IBM bid, that bid will cost Minnesota at least $1,904,648.40 more than the Telex bid," according to the complaint.

The complaint also contends that IBM and Tele-Terminals were in violation of one of the state's criteria for accepting bids because the call for bids did not allow companies to bid in consort. "Tele-Terminals and IBM both represented that they had bid independently and that their bids were submitted without collusion and without agreement," the complaint states.

The equipment, which includes IBM and IBM-compatible printers, control units, CRT termianls and modems, was to be serviceable by one vendor as specified by the state's request for bids. According to Smith, IBM would not service equipment that was not its own, so they used Tele-Terminals as a third party in order to attain the contract.

"We respond to each opportunity for business as is appropriate," an IBM spokesman said, "and that is what we did here." He explained that this is why it entered into the joint agreement with Tele-Terminals. However, no comment about the buy-back agreement could be made, the spokesman said.

McLeary said that Tele-Terminals is acting as a sales agent for IBM. "We have a distribution relationship with IBM that is the same as we have with Digital Equipment Corp. or any other vendor," he said. "We handle sales and service for 20 or 30 companies. In this case, we aren't buying the equipment from IBM and then turning it around and selling it to the state. We're only handling the maintenance."

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'Huge Momentum' Seen Building for Videotex

By Brad Schultz
CW New York Bureau

PORT CHESTER, N.Y. — "A huge momentum is starting to build" for videotex services, but several more years may pass before videotex is accepted by a major portion of businesses and homes. That, at least, is the opinion of an AT&T executive, speaking at Online, Inc.'s Information Utilities '82 conference here last week.

More than 60 companies have begun "significant" videotex activities and at least 80 videotex experiments have taken place around the world, according to Thomas E. Farmer, director of information management in AT&T's Consumer Products Division.

Videotex refers to personal information services delivered over telephone lines or coaxial cable to terminals or small computers in offices or residences.

These services may be interactive. For example, the videotex user may query a remote data base to learn what solutions are available for a particular problem. A form of videotex called teletex entails one-way broadcasting of information over coaxial cable. This information can appear on a conventional TV set, Farmer noted.

Four Forms

But hybrid systems, allowing selection of two-way or one-way modes, will also deliver videotex services, he said. The services are coming in at least four forms: information retrieval, transactions, interpersonal messages (electronic mail), problem solving and video entertainment, Farmer said.

The advent of videotex raises the question of whether consumers will prefer terminals to personal computers, Farmer suggested. A personal computer with communications capabilities can function as a terminal in engaging videotex services driven by a remote mainframe computer, but can also provide local computational power.

The AT&T executive cited market research, which reportedly concluded that no single videotex service can provide typical users with dollar benefits equivalent to the cost of subscribing to the service plus buying a terminal adequate to receive it. In other words, users will only buy terminals to get services if the terminals convey a number of services, which collectively justify the investment, Farmer explained.

The service most popular with users would typically provide dollar equivalents to only one-fourth the cost of subscription and terminal procurement, Farmer declared, referring to the market research study.

Farmer named three issues critical to successful marketing of videotex services: what users can get for their money, whether services are worth their money and whether service suppliers conclude that videotex can be marketed profitably. He indicated that the variety and nature of coming videotex services will be sufficient to generate considerable user interest, but the latter two issues hinge on efforts to standardize videotex protocols and formats.

AT&T demonstrated its commitment to videotex standardization last May, Farmer asserted, when the world's largest telecommunications supplier unveiled its Presentation Level Protocol (PLP, which is intended to support videotex operations.) AT&T and CBS will this year commence a videotex experiment in New Jersey, according to Farmer. Last year, AT&T and Viewdata completed a 14-month videotex experiment in Florida.

Such experiments test market demand for videotex and bring to light technical problems associated with delivering such services on a large scale.

Tres Schedules CIS, EIS Meets

DALLAS — Tres Systems, Inc. announced the dates of its 1982 user conferences for the Customer Information System (CIS) and Employee Information System (EIS). Both events will take place here.

The CIS conference will be held April 19-21, and the EIS conference will take place April 27-29. Both conferences feature guest speakers and round-table discussions in addition to workshop sessions. They are sponsored by Tres Systems and user companies whose software installations include those licensed from Tres.

Registration costs $100 for the CIS conference and $125 for the EIS conference. Further details can be obtained from Tres Systems at Suite 220, 4255 LBJ Freeway, Dallas, Texas 75234.

Information Technology Session To Feature Novel Applications

GAITHERSBURG, Md. — The "Trends and Applications 1982: Advances in Information Technology" conference here May 27 will feature state-of-the-art appraisals and novel applications of information technology.

General session topics featured on the preliminary program are: "The Computer as a Management Tool," "The Traditional Computing Center as a Modern Network Node" and "The Stars Technology Development Project."

Other sessions will cover data base machines, reducing ambiguities in methodology definitions and teleconferencing systems. The conference is cosponsored by the NBS Institute for Computer Sciences and Technology and the Washington, D.C., chapter of the Institute of Electrical and Electronics Engineers.

The registration fee is approximately $40. More information is available from Elizabeth Parker, Administration Building, National Bureau of Standards, Washington, D.C. 20234.

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Closer Cooperation Needed

ISI Users Told DPers Can Aid People Problems

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — Closer cooperation between the data processing and human resource functions within large corporations is necessary to take advantage of the new information age, an international consultant claimed here.

Speaking at the recent 1982 Integral Systems, Inc.'s (ISI) Users' Conference, Thomas Handley, a partner in Fromkin Van Horn, a Toronto-based international consulting firm, said DPers could help in resolving human conflict within companies.

To do this, the Management Information Systems (MIS) function must be willing to share its power base, he said.

"As we get into the automated office environment, the DP partnership with the human resource function is going to become more crucial for the successful introduction of new technology," Handley asserted.

Reciprocal Aid

The South African-born consultant claimed that while DPers could help personnel specialists to function more effectively, the human resource specialists could in turn help the MIS department structure the interface between man and machine and deal with the social implications of technological change.

Handley also pointed out that DPers were badly in need of acquiring effective communication skills and that this was another potential area for cooperation with the human resource department.

He emphasized the need for the human resource function to develop hard number performance measures with which to judge its effectiveness. Technology could help with this measurement, he maintained.

If software packages containing hard number performance measures for the human resource function were introduced, he said these packages would help improve the quality of management and productivity.

Among the types of performance measures that could be incorporated into software packges, Handley suggested the following:

- Productivity measures that would enable the human resource function to look at revenue produced in relationship to the number of employee days worked.
- A software package that would illustrate the relationship between revenue and compensation systems — one that allowed personnel specialists to measure average compensation per employee days worked. This, said Handley, would give managers a quick and reliable analysis of cost compared to a firm's revenue production.
- A package that monitored response times for job applications. This would tell the company whether or not it was responding quickly enough to potential employees. "When you are in a high-service industry, such as banking, you need some measure of how you are treating people who try to get into your organization," Handley said.

He argued that such hard number performance measures could be incorporated into existing software packages for relatively little extra cost. Compensation — an organization's major cost — and productivity, which is critical for its survival, were areas that require close monitoring, he asserted.

Turning to the role of strategic planning in an organization, Handley said most human resource departments operate without the use of long-term strategic plans. This planning requires an interaction with the task environment in which an organization operates, which in turn requires a familiarity with computers and communications technology, he said.

The management challenge of the 1960's, Handley said, was to grow bigger. The challenge of the 1980's is to grow better. With information workers now representing almost 50% of the labor force and another 28% employed in the service sector, we are witnessing a dramatic change in the nature of work, he claimed.

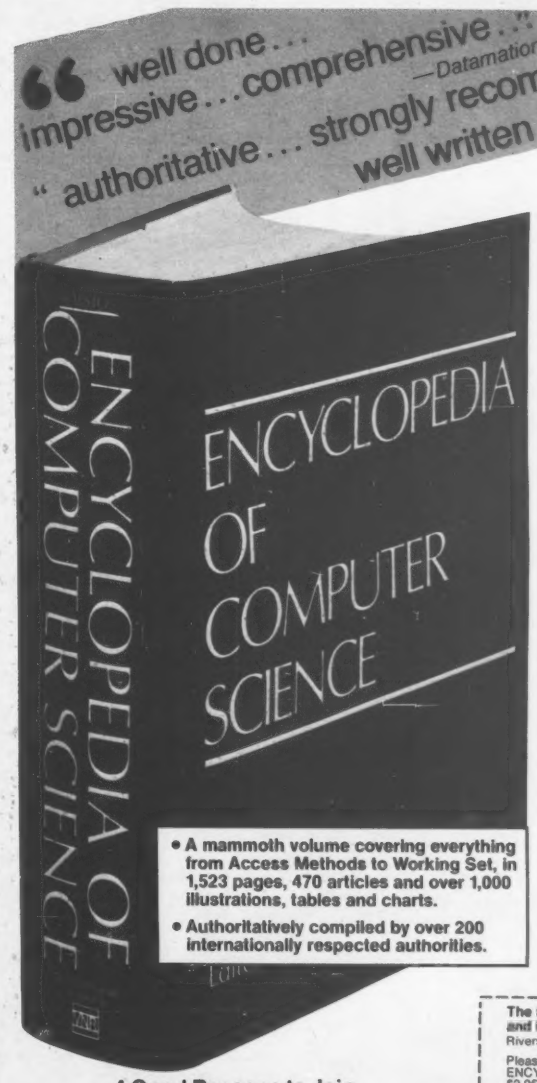
DP Productivity Theme of May Meet

CARMEL, Calif. — "Eight Steps to Programmer Productivity" is the theme of the Software Productivity Management Conference that will take place here May 6-7.

This event is being co-sponsored by the Education Consortium — a fellowship of organizations specializing in training, education or consulting — and the information system consulting firm of Kapur & Associates, Inc.

Presentations will include successful case histories and specific steps to implement the recommended productivity improvement plan, according to a spokesman.

Registration is $250 for Education Consortium members and $295 for nonmembers. Additional information is available from Kapur & Associates at P.O. Box 386, Danville, Calif. 94526.



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NYC Schools Use DP to Build for Future

By Bob Johnson
CW New York Bureau

NEW YORK — Data processing in New York City's public school system (PSS) means more than just information processing to the people involved. Because childrens' education is its' ultimate goal, Sally J. Rupert, the director of DP coordination, describes her office's work as "building systems for future generations."

In her 2½-year tenure, Rupert and her staff have turned what she called "a backward DP installation" into a shop that is comparable to any private-sector computer environment of its' size.

Rupert likes to think of the work of the city's school DP system as "computerizing the business of education" and in that respect, she administers to the computer areas just as any business would be.

Her office of DP coordination directs the DP administration for the city's 32 independent school districts and includes a staff of 170. Rupert said that the central data center located in Brooklyn uses an IBM 3031 CPU and a recently acquired Amdahl V7B CPU. Both systems are hooked up to 325 terminals in all of the districts and they process nearly 400,000 transactions daily. In addition, the office oversees 1,000 Board of Education-owned buildings, which house 1,000 microcomputers and 170 word processors.

System's DP Image

Although the school system's computer areas have made progress, Rubert explained that she is concerned with the school system's negative image in the annals of DP and wants to show, by example, what has been done and what can be done.

She cited progress in the development of automated administrative systems such as on-line financial systems for budgeting and salaries, a new data base management system and security system and plans for on-line purchasing and payment accounting systems, as indicators of her office's attempt at becoming "state-of-the-art."

"Our industry doesn't realize what really dynamite administrators public-sector managers are, considering the restraints they work under," she noted.

In the area of student information, Rupert's office has implemented a student biography file system that can give the school administration data on students in areas such as vocational training and competency testing. "The better we make our support systems, the better it will be for children in the school system," Rupert said.

Future PSS DP Plans

Plans for the PSS's future in DP are ambitious. Ruper noted that her office has outgrown the physical space it now occupies and new sites are being planned to facilitate growth. One of the new buildings, although not yet approved, would not only contain hardware but would be a student DP information center giving students access to industry information, Rupert said.

A unique part of the PSS's future plans are the activities of its Division of Curriculum and Instruction, which include the creation of a Computer Information and Science Unit. This unit's function is to house microcomputers and a software library to be used by school personnel in selecting appropriate computer equipment and curriculum.

Rupert said that the unit will also have a lab where software can be tested. "Our schools have invested in hundreds of microcomputers to be used in academic programs as well as for use in teaching about computers and programming. The creation of this unit will provide for a focal point to coordinate this instructional development activity," she said.

The use of computer technology by the PSS is not just centered around administration, however. Rupert described three major areas of instructional systems development that her office is undertaking as well. They include a computer-literacy curriculum for high schools; a computer-managed and -assisted instructional program, which will build networks of small computers to share resources and to deliver instructional support; and occupational training programs in DP and related fields that will encompass programming, computer operations, data entry and WP.

Automated High School

In fiscal 1983, Rupert's office is planning to initiate the Bronx High School of Science as an "automated high school." As part of an experimental program, the school will automate its administrative functions as well as instructional support. The plans call for the use of computer-aided instruction (CAI), data retrieval for research and computer-related experiments.

If the project proves successful, Rupert said that the program will be expanded to other city high schools. She noted that the experiment will give the school system a real taste of distributed data processing, which will allow it to take advantage of all of the system's computerized efforts.

Rupert hopes that the combination of administrative support systems — which her office has installed — and plans to install, along with CAI, will give the school districts in New York City all the benefits the computer has to offer. Rupert noted the end result being that the city's children will be among the most technically savvy in the country.

Aviation Meet Set for May 20

TORONTO, Ont. — The sixth annual aviation conference, sponsored by I.P. Sharp Associates, an APL time-sharing and on-line public data base firm, will be held May 20-21 at the Halloran House in New York City.

Judith Connor, assistant secretary for policy and international affairs, U.S. Department of Transportation, will deliver the keynote address, entitled "So the Government Got Off Your Backs? Now What's Your Plan?"

Technical sessions covering topics relating to the use of software and data bases in the aviation industry are scheduled for the conference.

Attendees can examine tools such as management graphics, computer graphics for route maps, record-handling systems, decision-support systems and systems for schedule management.

Registration is $75, and forms can be obtained from the Aviation Products Department, I.P. Sharp Associates, Box 418, Exchange Tower, 2 First Canadian Place, Toronto, Ontario, Canada M5X 1E3.

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Within Six-Month Span

Media Group Saves 10 Times Cost of T/S Service

By Marguerite Zientara
CW Staff

DETROIT — The Evening News Association (ENA) here saved more than 10 times the cost of a computerized fixed-asset management time-sharing service after using it only six months.

ENA is a national media group composed of television and radio stations and daily and weekly newspapers. Among its members are *The Detroit News* and WDVM-TV in Washington, D.C.

ENA has more than 100,000 fixed assets, including photographic equipment, broadcasting equipment and printing presses.

In dealing with the year-end tax crunch, the job of calculating depreciation had become monumental and time-consuming.

Software as Time-Saver

By 1979 ENA was looking for some software as a time-saver. "We talked with our public accounting firm and mainly they were aware of software packages that we'd have to purchase," explained David Mitchell, ENA's corporate benefits and tax administrator.

"We didn't know of any time-sharing companies that had the depreciation program except ADP Network Services of Ann Arbor, Mich.," Mitchell said. ADP was "just pioneering its depreciation program since we were the first company in the world besides their own internal users to have the system," he added.

While ENA hoped to save time by accessing ADP's service in early 1980, it never dreamed of the $100,000 it would realize in additional depreciation vs. the $10,000/year it spends on the service. "We didn't anticipate dollar savings when we got into this," Mitchell said.

"We were looking for help to get us through the year-end crisis. With all the efforts centralized, this is a tremendous job manually," he said. "Normally it involves many workdays just to produce the depreciation schedule, while it can be done on the ADP system in a matter of hours."

The ADP system supplies summaries of information and calculates investment credit, categorizes assets for tax reporting and figures gains and losses on dispositions and investment credit recapture.

Optimum Time

The monetary savings were realized when the ADP Fixed Asset Management Service automatically switched depreciation methods at the optimum time from double-declining balance to sum-of-the-years digits (SYD), Mitchell explained.

ENA had been switching from double-declining balance to straight line, even though the switch to SYD offered greater tax advantages. After analyzing all the effects through all the divisions, the savings amounted to more than 10 times the cost of the system, he said.

ENA has had few problems with the system except "some bugs that you would expect in very complicated updates and calculations," Mitchell said, "but they fix them as fast as I complain about them."

Is he basically happy with the system? "I'd hate to be without it," Mitchell said.

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The moveable keyboard has 87 keys plus 8 program function keys plus the comfortable touch and sturdy feel of the IBM Selectric.™ And you can get a separate 12-key numeric pad for even more efficiency.

The IBM 3101 ASCII display is fully compatible with many IBM and non-IBM computer systems. It can access most remote computing and time-sharing services.

Call one of our distributors and order the IBM 3101 today. While on the line, ask about our new IBM 3232 high-speed printer.

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See Page 16

Managers on the Move

Joe L. Orren

JOE L. ORREN has been appointed manager of planning and control of the steel-related business for Armco Steel Corp.'s information resources management, based in Middletown, Ohio.

Formerly manager of industrial and systems engineering for the Eastern Steel Division, Orren joined Armco's Houston Steel Works in 1955. He held a variety of positions in industrial engineering with the Houston Steel Works and Armco's corporate headquarters staff. In 1972 he was promoted to manager of the cost-efficiency program and later became manager of standards and rates and manager of methods and data administration. Orren moved to the Eastern Steel Division as manager of industrial systems and engineering in 1978.

He received a B.A. degree in industrial management from the University of Houston. He is a member of the American Institute of Industrial Engineering and a member of the Association of Systems Management.

•••

ROBERT M. JOHNSON has been promoted to manager of planning and control for the nonsteel-related business for Armco's information resources management.

He joined the Industrial Engineering Department of Armco's Baltimore Stainless Steel Division in 1957. He became the works industrial and systems engineer for the Baltimore works in 1973. Transferred to corporate headquarters in Middletown, Ohio, in 1976 as manager of systems development, he was later appointed manager of systems support.

He holds a B.S. degree in mathematics from Loyola College in Baltimore and is a member of the Association of Systems Management.

Robert M. Johnson

CHRISTOPHER P. MOORE has been promoted to manager of policies, procedures and services for Armco's information resources management.

Formerly manager of information resources for Armco Building Systems Division, Moore joined Armco's National Supply Co. in 1951 as an accounting clerk. Later promoted to auditor and staff accountant, he was transferrred to the Ambridge, Pa., works of Armco Tubular Division as supervisor of general accounting in 1960. In 1972 he was appointed supervisor of payroll and tabulating for the Metal Products Division, where he held numerous positions before first becoming manager of systems and then manager of information resources for Armco Building Systems Division.

Christopher P. Moore

Moore earned a B.A. degree in business administration and accounting from Pace University, N.Y. He is a member of the Association of Systems Management.

•••

DONALD R. MALARKEY has been appointed manager of administration for Armco's corporate information resources management.

Formerly manager of business information systems, Malarkey joined Armco's Butler, Pa., works in 1960. He held a variety of positions at Butler before transferring to Armco's General Office in Middletown, Ohio, in 1969 as general supervisor of systems computing. He was promoted to manager of systems computing in 1971 and has since held various managerial posts in the regional comput-

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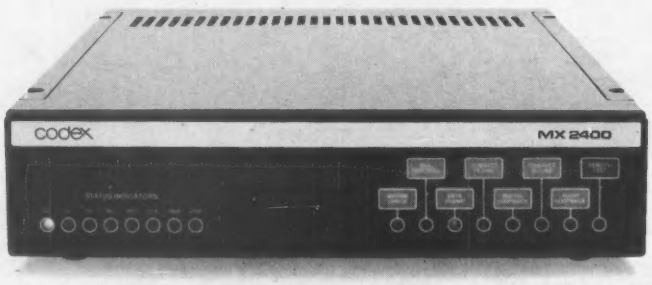

Managers on the Move

Donald R. Malarkey

er center, systems services and systems engineering.

He holds a B.S. degree in education from Edinboro College, Pa., and a B.S. degree in industrial engineering from Pennsylvania State University. He is a member of the Association of Systems Management.

•••

GEORGE E. SNYDER has been named director of management information systems (MIS) for LaBarge, Inc., a manufacturer and specialized processor of precision tubular products in St. Louis. In this newly created position, he will be responsible for the coordination of, and planning for, the information needs of management through the use of automated systems.

Snyder's prior experience in MIS includes more than 30 years with Anheuser-Busch, Inc. in St. Louis,

George E. Snyder

where he most recently was manager of MIS planning and control.

He received a B.A. degree in business from Washington University in St. Louis.

•••

JOSEPH C. MARCOTTE has joined Columbia Pictures Industries, Inc., New York, as director of quality assurance for the MIS department. In this capacity, Marcotte will be responsible for insuring quality for Columbia's MIS operation and will be involved with programming, software and hardware.

He has held various positions at Transamerica Interway from 1976 to 1982, serving as data processing manager of freight, manager of systems and programming and programming manager.

•••

GARY D. BEACH has joined McDevitt & Street Co., general contractors based in Charlotte, N.C., as director of information services.

Gary D. Beach

Beach was formerly systems and programming manager for Family Dollar Stores and for the past three years has been a part-time instructor in data processing at Central Piedmont Community College.

He holds a B.S. and an M.B.A. degree from the University of Detroit.

•••

ROBERT J. SMEREK has been appointed corporate project manager

Robert Smerek

for LaBarge, Inc. In this capacity, Smerek will develop and implement automated systems at the corporate level of the company.

Before joining LaBarge, Smerek was manager of systems and programming for Hussmann, Inc.

•••

LARRY W. OLSON was recently named vice-president of technical services at List Processing Co., Inc. in Addison, Ill. Prior to this, Olson was director of operations at the company. He was founder and president of Performance Programming, which was acquired by List Processing in August 1980.

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'Business Within a Business'

Manage DP Like Business, Consultant Urges

By Jeffry Beeler
CW West Coast Bureau

ANAHEIM, Calif. — Corporate DP shops are a "business within a business" and ought to be managed accordingly, the head of an East Coast consulting firm said here recently.

Failure to run an information systems department as if it were a discrete business entity can seriously jeopardize a DP manager's chances of advancement and can even result in the loss of the individual's job. So said Atlantic Management Systems, Inc. Chairman Richard Thatcher Jr., one of the speakers at the Software Expo/West conference.

Thatcher described the typical corporate computing department as a large company in microcosm. "Make no mistake about it," he said, "DP operations today are big business and contain exactly the same basic functions as any major corporation."

Company Operation

To manage such a business-oriented organization effectively, a DP director can ill afford to limit his professional interests to technology alone. Today, information systems managers need to know as much about the operation of their companies as they do about the workings of their processors.

"If you want to succeed in your chosen field of endeavor," Thatcher told his listeners, "you have to understand where your overall organization is going."

The problem, he continued, is that "many DP managers don't know a thing about running a computing department as a business." So in many of today's large corporations, the task of heading an in-house systems operation is increasingly being performed, not by longtime technologists, but by executives with a strong background in general management.

To protect themselves from further job displacement, DP directors "first need to recognize that information systems departments are a business within a business" and therefore should conform to the same management principles as any other organization, Thatcher said.

Knowledge of Finance

The company chairman also urged DP managers to counterbalance their technological expertise with a practical knowledge of finance. "If you're interested in professional growth, don't go just to data base school," he advised, "go to management school as well."

During the next two years or so, Thatcher predicted, practically all corporate computing departments will begin "charging out" to their users and will switch to the practice of separate cost accounting.

Without such basic changes in accounting procedures and service arrangements, information systems managers may have a hard time gaining their nontechnical colleagues' respect. "If you want what you do to be appreciated, you first have to put a dollar sign on it," he said.

Bright Future

For the most part, DP managers can look forward to a "tremendously bright future" that will likely bring them increased opportunities for both professional advancement and financial reward, Thatcher said.

Within the next four to five years, for example, computing department directors will routinely begin to receive the same kinds of cash incentives that people in other business disciplines, especially sales personnel, have long taken for granted, he continued.

At present, however, most information systems managers are still "significantly frustrated and badly underpaid," Thatcher said. "These people are typically intelligent, talented, hardworking, honest and reluctant to maintain the status quo. But in many cases, they're not advancing in their organizations or being recognized for their accomplishments. In fact, they often find themselves the targets of brickbats," he said.

Conference to Cover DP Productivity

CARMEL, Calif. — "Eight Steps to Programmer Productivity" is the theme of the Software Productivity Management Conference that will take place here May 6-7.

This event is being co-sponsored by the Education Consortium — a fellowship of organizations specializing in training, education or consulting — and the information system consulting firm of Kapur & Associates, Inc.

Presentations will include successful case histories and specific steps to implement the recommended productivity improvement plan, according to a spokesman.

Registration is $250 for Education Consortium members and $295 for nonmembers. Additional information is available from Kapur & Associates at P.O. Box 386, Danville, Calif. 94526.

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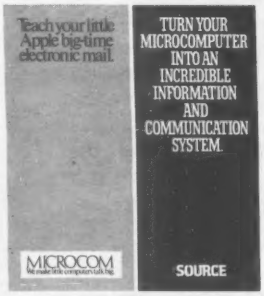

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Touch 'n Talk Increases Credit Card Applications

MINNEAPOLIS — Since a Touch 'n Talk computer system was installed at a local department store here, applications for credit cards have risen by 38%.

Information Dialogues, Inc. (IDI), also located here, designed a combination touch-screen, synthesized voice and hard-copy printer system for Dayton's Department Store, which wanted customers to be able to apply for instant credit and avoid the red tape of a credit office. The Touch 'n Talk reportedly allows customers to obtain $300 worth of credit immediately.

To use the system, customers touch one of 32 specially coated pads on a 15-in. face plate mounted in front of the CRT. Entries are displayed on the screen and repeated by the voice synthesizer. A hard-copy form is printed out, which the customer takes to a salesman for completion. The store's credit department then checks the application against the customer's drivers license and another major credit card. The salesman presents the customer with a temporary card good for $300 worth of purchases until the permanent card is mailed out.

The system is one of three touch systems developed by IDI since 1978 for Dayton's. The other two systems were used by customers to record bridal or Christmas gift lists. According to Cyndi Schlosser of Dayton's public relations office, the store is planning to install a second Touch 'n Talk for a baby registry.

IDI has retrofitted Digital Equipment Corp.'s VT100 13-in. screen and the Televideo, Inc. 950 12-in. screen for use with the touch-screen. The Ann Arbor, Inc. Ambassador D Case 15-in. screen, the Hazeltine Executive Corp. 80 Model 20 15-in. screen and the Lear Siegler, Inc. ADM31 15-in. screen have also been retrofitted. According to IDI, the touch-screen can be retrofitted to run on any model hardware. Output is available in Ascii code at 75- to 9,600 bit/sec, RS-232 or transistor-transistor logic.

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Kleinrock Wins Ericsson Prize

STOCKHOLM, Sweden — Prof. Leonard Kleinrock of the University of California at Los Angeles' computer science department has been named cowinner of the $35,000 L. M. Ericsson Prize, to be awarded here May 5.

The prize and accompanying gold medal is given in recognition of "notable contributions to telecommunications research and development." Kleinrock was singled out for his work in developing new techniques for data transmission and the solution of data traffic problems and theories on packet-switching.

Dr. Lawrence Robert, a cowinner of the 1982 prize, was lauded last year for his work in deriving practical applications from telecommunication technology.

Seminar Details OA Networks

NEW YORK — Probe Research, Inc. will hold a seminar entitled "Linking the Office to the World" here May 17-18.

The seminar will explore new advanced local-loop service options and their benefits for users.

Speakers include representatives from manufacturing companies and user companies such as Macomnet, Inc., McGraw Hill, Inc. and S.C. Johnson.

Some of the services to be covered include integrated digital service and high reliability, text/voice messaging, high-speed electronic mail/facsimile and modem-free transmission.

The registration fee is $695 and $625 for each additional attendee from the same organization. Probe can be contacted at P.O. Box 590, Morristown, N.J. 07960.

Technical/Legal Problems Covered at IIA Meet in May

NEW YORK — A series of workshops sponsored by the Information Industry Association (IIA) for industry executives will be held May 19 at the Grand Hyatt Hotel in New York City.

The featured speaker is Rep. Robert W. Kastenmeier (D-Wis.), Chairman of the House Subcommittee on Courts, Civil Liberties and the Administration of Justice, who will deliver the keynote address on "Legislating Information Law in an Era of New Technologies."

Other topics to be covered include antitrust jurisdiction, freedom of information, cable copyright, computer software and intellectual property issues.

Three workshops to be conducted by IIA councils are also included and will cover the following topics: "Data Base and Information Content Providers Talk Back to Suppliers and Vendors," "Electronic Publishing: Major Legal Problems," and "An Industry Travel Log of Suppliers and Buyers of Information-Handling Capabilities."

Registration fees paid before May 5 are $115 for members and $195 for nonmembers, according to an IIA release. Registration paid after that date is $175 for members, $245 for nonmembers.

Reservations can be made through IIA, Suite 400, 316 Pennsylvania Ave., S.E., Washington D.C.

Free Brochures

• *How to Use a Computer to Plan Smarter* is a booklet put out by Access Technology, Inc. to introduce computer modeling to people with little or no experience in the use of computers. Topics include building a budget, an integrated business plan, job costing and a heat-transfer problem. The text also describes several "friendly" software packages for the experienced computer planner. The booklet can be obtained from Access Technology, 6 Pleasant St., S. Natick, Mass. 01760.

• *Expanding the Realm of Communication,* a 12-page brochure covering current trends in hard-copy message transmission, is available from Sidereal Corp. It contains an overview on message communications, how communications networks evolve, advantages and problems inherent in different types of networks and the evolution of electronic mail. It also details how to select telecommunications equipment is available from Sidereal, 9600 S.W. Barnes Road, Portland, Ore. 97225.

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End Users Gain Access to Data via Info Centers

By Lois Paul
CW Staff

NEW YORK — As a first step toward putting more computing power into the hands of its end users, U.S. Trust Co. of New York has set up information centers at two of its locations here.

The development effort has been ongoing for about 18 months, according to Joel Abramowitz, senior vice-president and director of information systems, but the major work has taken place in the past year.

Abramowitz said the current information center setup they are using is based largely on the IBM-defined concept, which includes software packages such as A Departmental Reporting System (ADRS) and APL Data Interface from IBM for use on their two IBM 3033s that run under MVS and include IBM's IMS and TSO. The firm is also using SAS Institute, Inc. SAS/Graph graphics software and IBM's Graphic Data Display Manager.

Information Centers

Joseph Allard, vice-president for systems development at U.S. Trust, directly supervises the information centers, which currently have one full-time manager and three consultants who work directly with end users.

Two years ago, U.S. Trust representatives attended an IBM executive briefing session on the information center. Allard said his firm experimented with the concept by using ADRS on a limited basis with several users. When this pilot was successful they began to expand to other users.

Currently the information centers staffers are supporting between 20 and 25 users.

Basically, the information center analysts work with the end users to define their data requirements and then to extract the data they will need to work with from the company's master files. The end users are taught to use the available software products to produce the reports they need and to massage the data.

Building Own System Key

The key, according to Allard, is for the end users to build their own systems, rather than to persuade the information center staff to complete the applications for them. The users typically spend only a few hours a week working with their data.

The information centers are using IBM 3279 color terminals, which both Allard and Abramowitz said are extremely helpful for the users.

Training is conducted mostly on a one-on-one basis by the information center staff, using the manuals supplied with the software packages. To date, awareness of the center's availability has depended mostly on word-of-mouth recommendations by current users.

Abramowitz noted that most of the end users taking advantage of the information center at this time are department managers and vice-presidents.

People are the key to the success of the information centers, Allard said. He stressed the importance of finding people who are end-user oriented, have excellent communication skills and some technical background.

Pete Arrighetti, U.S. Trust Co. vice-president and controller of asset management, accesses data on an IBM 3279 color display terminal.

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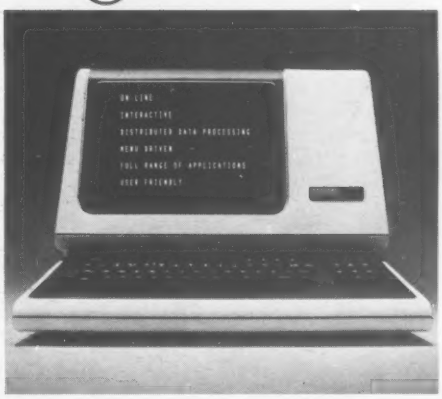

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CW4/582

Home Is Where the Solution Is

Furniture City Brings Its DP Problems Home

LENOIR, N.C. — Known as the Furniture Center of the South, this city in the foothills of North Carolina employs 260 full-time municipal employees and is currently operating a $7 million budget.

Lenoir had been struggling for a number of years with the demands of a growing volume of work placed on its manual and mechanical methods of data processing, according to Elizabeth D. Wilson, financial director for the city. The highest volumes of work came from the utility billing, tax billing and payroll.

The city decided to send this work load to a local DP shop. Data originated in the DP department of the city was keypunched, verified and sent out on a cost-for-time-used basis. The next move was to employ a full-time programmer/analyst.

At that point, the city was striving to develop in-house applications to handle general ledger, accounts receivable, accounts payable and fixed asset records. Arrangements were made with the outside DP shop to provide the city with machine time for testing the applications. The hardware in use was an NCR Corp. 8250 located three miles from the city office.

However, on-going maintenance, the lack of a rigid timetable and other problems led to the resignation of the programmer after three years. The use of an outside DP shop had led to too many problems, Wilson said.

A consultant with expertise in state and local governments was then brought in to investigate the possibility of a regional computer center. The consultant was also asked to participate in the request for bids when it came time to find a vendor.

It was determined that the city's needs required an on-line system with the capability to run in a multitask environment, Wilson said. It was also necessary that the system and the application software be available to the end users — eliminating the need for a technical staff.

It was finally decided that a turnkey system from Cogebec Information, Inc., a software firm, would be purchased. The hardware for the system utilized the Wang Laboratories, Inc. Wang 2200VS minicomputer with software from the vendor. It has 656K bytes of memory, 165M bytes of disk storage and six terminals, according to Wilson.

The integrated transaction-oriented financial management system contained general ledger adhering to double entry fund and encumbrance accounting mandated by the goverment standards. It also contained purchase order control, aged accounts payable, fixed asset inventory, payroll and personnel, tax billing, utility billing and aged accounts receivable.

The system supports user-defined report generators in a variety of formats in addition to file inquiries, mailing lists and labels and dictionary-based retrieval, Wilson said. "The program has been designed to run on a series of menus and is extremely user friendly," she said.

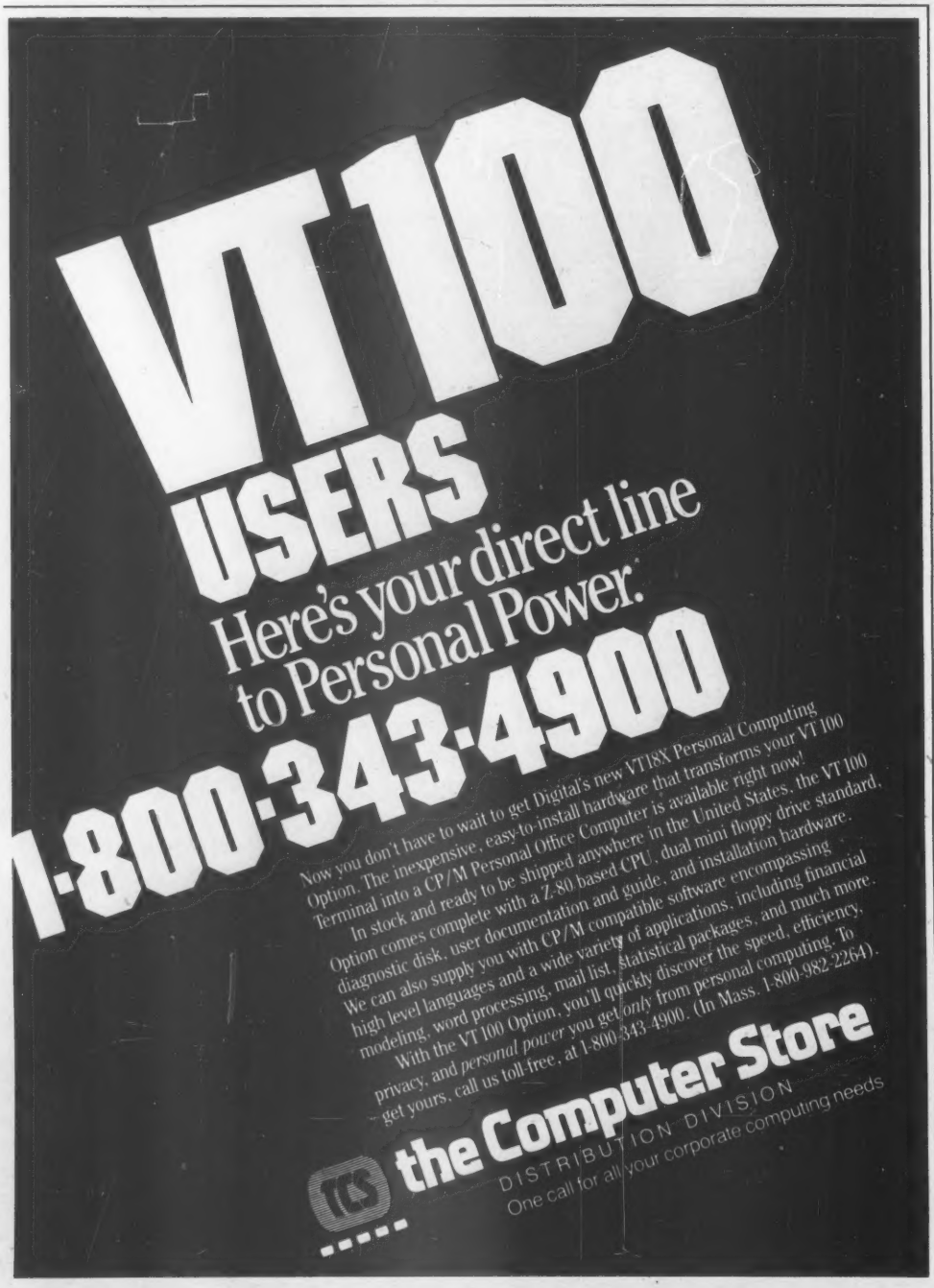
Customization has generally centered around specialized payroll reports and multifunds to account for billing and other functions. "The customization tends to make the user unique, but does not affect the basic system nor require major modifications," Wilson said.

Greater Productivity

"The sophistication of the package has enhanced resource management resulting in greater productivity," Wilson said. "Being transaction-oriented, customer detail files are updated immediately and current financial data is obtainable within a maximum of three working hours after the day's close. The aged receivables and payables are powerful tools in planning cash flow and investments," she said.

"For a large DP shop with a satisfactory functioning staff, the application package bought off the shelf is an alternative answer," Wilson said, "and its purchase can be justified with hard facts and figures. For the small user who intends to enjoy the sophistication of his larger counterpart, the application package is the only answer," she said.

"We intend to expand out of finance eventually," Wilson said, "We'll go into public saftey like police systems. I think we're going to see a lot of turnkey systems cropping up in municipal governments. The economics make it possible."



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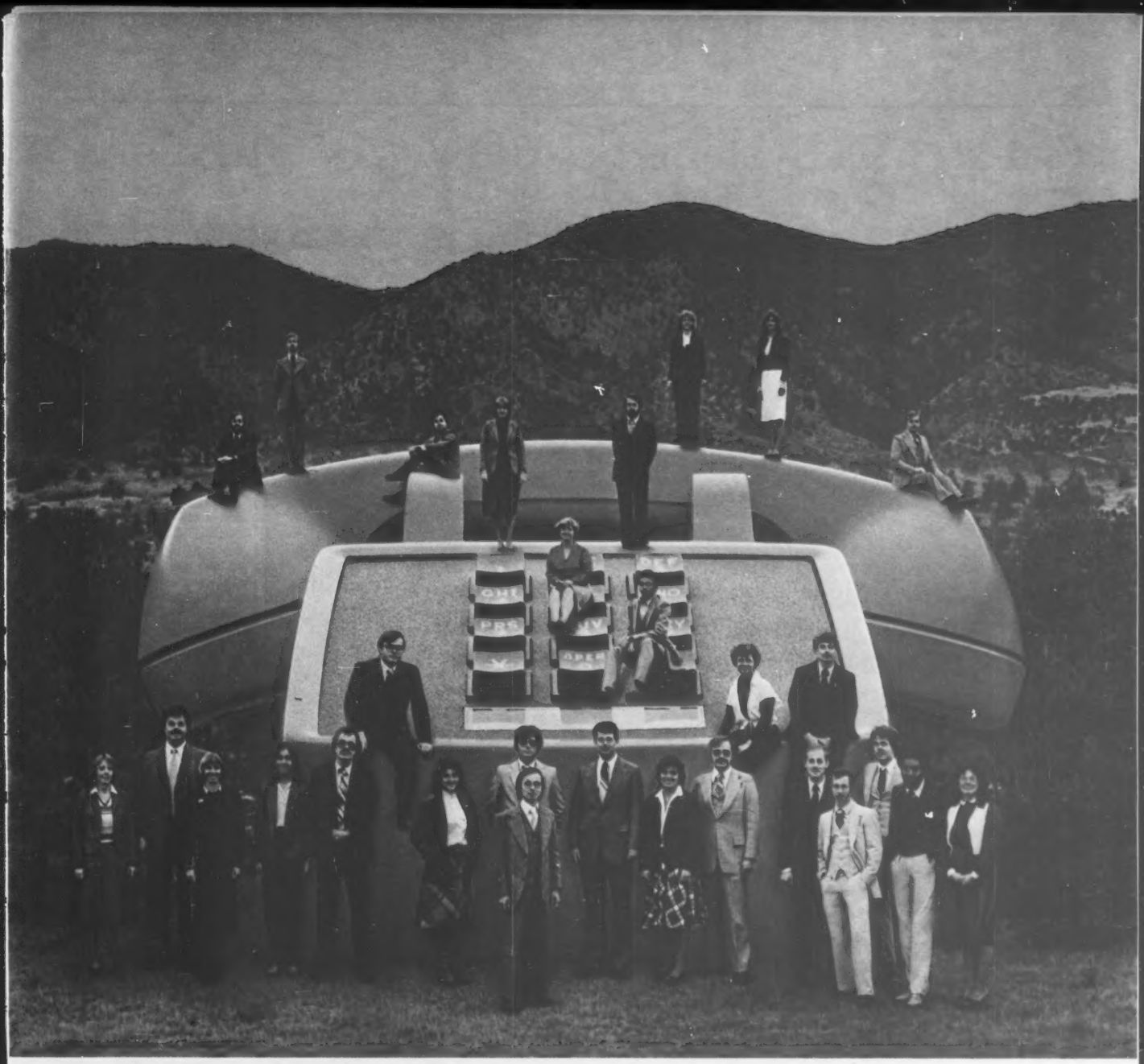

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British MI5 Systems Spark Privacy Questions

By Rex Malik
Special to CW‡

LONDON — Deep in the heart of the London shopping district is 26-28 Mount Row, listed in easily available government property records as Mod-X Computer Centre.

Mod stands for Ministry of Defense, and if you question the doorkeepers, that is all that they will admit to. In fact, the building houses the computer center of Britain's internal security service, MI5.

The story was broken in the left-wing weekly, *The New Statesmen*, here recently and is leading to attempts to impose some controls on the data the center keeps or can access. Using the *Statesman* revelations as a base and making further enquiries, it is possible to get a rough picture of what the center is and what it is used for.

ICL Equipment

It is MI5's main computer center. The building houses dual ICL, Ltd. 2980s, although which Model 80s it has not been possible to discover. The 2980 was designed in the early '70s and was, until recently, ICL's top-of-the-line mainframe.

There are, however, three models, ranging from about 1.5 times the power of the IBM 370/158 to nearly four times the power of the 370/158, depending on configuration. There is also a much smaller ICL 2960 for backup.

The MI5 system also includes more than 100 EDS 200 200M-byte disk drives, more than 20G bytes, giving it enough storage capacity, even after allowing for the disk drive overhead, for a sizable entry on every person in the UK.

But what are they working on? This is where the controversy starts. At the heart of it is whether or not MI5 is devising an on-line network that would link or otherwise directly access other government computers containing information about those outside government employment.

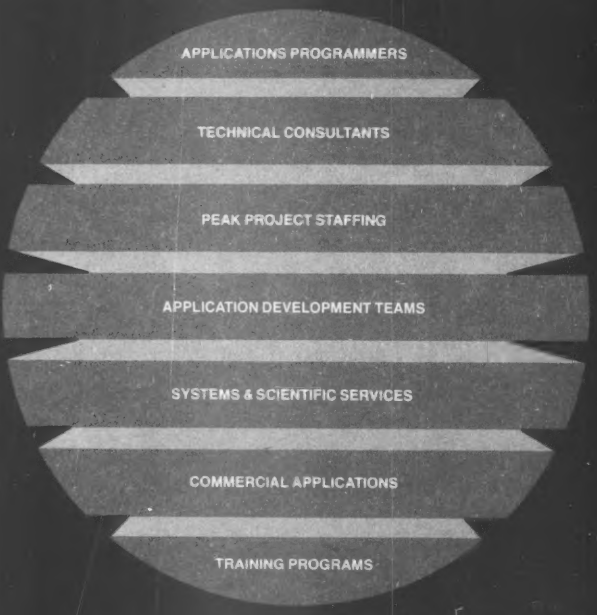
That MI5 has the authority to do so is known, having received that authority from the prime minister in a directive to the director general of MI5 made public in the early '60s. But should MI5 be able to do this on-line? If so, then government assurances given in 1975, to the effect that linking all government computers together in some form of network was against policy, begin to look suspect.

What is at issue is this: If the Mod-X Computer Centre is being developed to access any computerized records in government systems, then the technology required will become available to government.

Investigation of data in the public domain indicates that however MI5's computer system is working, its links to the outside world are not yet either real-time or interactive. Most of the systems are still working in batch mode.

It may well be that MI5's computer systems could eventually have on-line access to government data on citizens, but that is unlikely before the end of the decade. A senior ICL executive said, "I only wish he said that we could provide on-line access to all these systems. Believe me, if we had that technology, we would be offering it in our product line. As would anyone else."

Malik is a free-lance computer journalist based in London.



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For Intrasite Communications

PBX Seen Dominating Office Scene for Decade

By Bruce Hoard
CW Staff

DALLAS — "The PBX [private branch exchange] will dominate office communications distribution at least for the next 10 years," according to George M. Pfister, president of Perspective Telecommunications Group, a firm that recently conducted a study on intrasite communications networks (ISCN).

Pfister released details of the study at a press conference during the Interface '82 conference here recently Entitled "Intra-Site Communications Networks: Technical Alternatives and Applications," it defines an ISCN as a "communications network designed to serve the needs of applications and devices within the building or within a multibuilding campus."

The study was based on 80 interviews with users and 40 with vendors.

PBX Solution

PBXs are mentioned as one of four major classes of ISCN solutions. They are said to be workable solutions for all but the very high-speed and proprietary network applications. One major advantage they enjoy over other alternatives is that PBXs are wired to "virtually every workstation and major equipment location by reason of the telephone application," the study states.

Another advantage for the PBX is the abundance of unused twisted-pair wiring, Pfister claimed. "The twisted-pair wiring plant is installed and ubiquitous." He pointed out that every major building wired for telephone service in the U.S. has an extra, largely unused set of twisted-pair wiring running through it.

"It's simply not used," he explained. "If a building is wired for a PBX, it's double-wired."

High Data Rates

The Bell System has been using twisted-pair cable to transmit at speeds as high as 6M bit/sec over distances of one to two miles between repeaters and it is not difficult to transmit data in the extra bandwidth "above" that used for voice, the president added. Twisted pair can also be used at speeds of up to 56K bit/sec over the "typical 1,000 feet maximum range of ISCNs.

"Few general-purpose ISCN applications require data rates higher than 56K bit/sec and most are less than 9,600 bit/sec," the study declares. "Those which do require higher speeds are special-purpose applications, such as video. Those special purpose applications are low station density installations which can be wired independently."

The other three classes of ISCN solutions discussed by the study are general-purpose multiaccess networks, proprietary networks and dedicated wiring.

General-Purpose Nets

The general-purpose multiaccess network consists of systems such as shared coaxial cable local-area networks offered by Amdax Corp.; Interactive Systems/3M, Inc.; Sytek, Inc.; and Ungermann-Bass, Inc., the study says.

Their primary applications will be the interconnection of workstations, particularly high-speed workstations and computers, the study predicts. The more "general purpose" of those networks offering broadband-based CATV capabilities will also handle special applications such as video transmission for security and training.

"Proprietary networks are built for the express purpose of allowing devices built by the network vendor to communicate with each other," the study notes.

Such networks recognize that the devices at end points of the network represent more potential for revenues than the network itself and, "It is in the best interests of product vendors to have networks which will generate the maximum revenue for their own products," the study maintains.

Dedicated Cable

Dedicated cabling is called "the ultimate nonnetwork solution to ISCN applications." Most of the wiring for building management falls under this classification, but there is a trend toward proprietary multiple-access cables serving the application. Many of the connections between terminals and minicomputers are dedicated cabling, the study reports.

Despite Pfister's claim that the PBX will dominate office communications distribution for at least the next 10 years, the report takes a less ardent approach, saying, "There is no one ISCN solution." Some networks will dominate particular applications areas and some of those networks will exist side by side with alternative networks, according to the report.

The study seems to endorse broadband coaxial cable-based local networks over baseband competitors, saying "Broadband coax can provide a general-purpose transmission path at all of today's and the foreseeable future's speed requirements for ISCNs."

It says broadband modems are priced competitively with higher speed (9,600 bit/sec) VF modems.

In its recommendations for users, the study claims the key to the selection of an ISCN lies in the selection of a workstation.

"This is very much a user application consideration, but it is that application planning which will determine the requirements of the workstation and it is the requirements of the workstation which will determine the requirements of the ISCN to which it is connected," the study declares.

The report is available for $1,500 from the Perspective Telecommunications Group at 15 Prospect St., Highway 17 N., Paramus, N.J. 07652.

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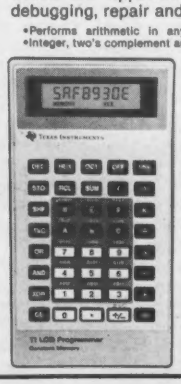

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Mini Dubbed Cure for Nursing Home Ills

WOODBURY, N.Y. — With a $15 million budget and 700 to 1,000 different expenditures that could be charged to more than 25 departments, the United Presbyterian Residence nursing home here had little choice but to computerize.

"We could not do what we are mandated to do without a computer," maintained George Casterlin Jr., former president of the health care facility.

The nursing home for long-term patients must adhere to a long list of federal guidelines outlined in the voluminous New York State Residential Health Care Facility Accounting and Reporting Manual. The text is said to be the bible of New York's 600 nursing homes and is thought to be a prototype for an upcoming set of federal regulations governing all U.S. residential health care facilities.

The lengthy assortment of codes, which dictate under penalty of fraud how every expense is to be accounted for, galvanized the Woodbury health care facility into streamlining procedures with a minicomputer.

Up until 1965, the facility housed 22 beds. In the next 10 years, it grew to 1,017 beds, mostly through mergers. Today, the residence includes a 31-acre site in Woodbury. In addition, it operates Flushing House in Queens, N.Y., a 12-story, 319-unit independent living facility for the elderly with 407 beds.

As late as 1974, transactions were posted on a ledger card accounting machine and the facility was run on a cash basis. Within that year, management switched to accrual accounting and installed a magnetic ledger card system whose capacity eventually was upgraded with the addition of more memory and punched cards. This temporarily satisfied the upsurge in beds.

However, maintenance costs were running $15,000 per year, and the payroll was still being sent to a data center. The argument for a sophisticated in-house computer system became substantial.

United Presbyterian opted to chart its own course and with the aid of NCR Corp. developed programs tailored to long-term health care operations. Eventually, the nonprofit organization plans to offer its programs to other nursing homes. "Long-term health care facilities in the '80s will not survive without some form of data processing," stated Melvin Katz, then vice-president of finance for United Presbyterian.

Reasons for Selection

Management selected the NCR 8250 mini because it was economically sound, easily upgradable and Cobol programmable. The latter was important because from the outset United Presbyterian planned to develop its own software with the idea of recouping the costs by offering the unique program to other nursing homes.

What United Presbyterian ended up with was two NCR 8250's, each with 128K bytes of memory and a total of 60M bytes of disk storage. The second system handles word processing and the text from three operating manuals and backs up the first computer.

The principal computer is on-line to six video display terminals, one each in payroll, accounting and personnel and three in data processing. Presently, all except those in DP are limited to inquiries. The payroll department, for example, may be interested in an employee's hours or sick time. Accounting also has access to the payroll files as well as patient information concerning room changes, payments and custodial accounts. Personnel can inquire into both employee records and payroll files.

While the current United Presbyterian installation is a sophisticated, integrated system, the NCR 8250 computer system installed in early 1979 is a relatively small computer.

Plans for the immediate future include making accounts payable and general ledger records available for on-line inquiry to the accounting department.

Do other diskette makers have this secret ingredient

$$V(Y|X)=V\left(\sum_{j=1}^{K}\beta_j X_j+\epsilon\right)=V\left(\sum_{j=1}^{K}\beta_j X_j\right)+\sigma^2$$

$$=\sum_{j=1}^{K}X_j^2V''(\beta_j)+\sum_{\substack{i=1\\ i\neq j}}^{K}\sum_{j=1}^{K}X_iX_j\mathrm{cov}''(\beta_i,\beta_j)+\sigma^2$$

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For Varied Distribution Centers

Bulky Order Processing Needs Met With Net

BRIDGEPORT, Conn. — General Electric Co.'s Housewares and Audio Division, faced with the problem of processing orders for 30,000 customers through a variety of distribution centers, installed a data communications network based on their own compatible, modular network processors and statistical multiplexers.

Based here, GE operates three domestic manufacturing plants, four international plants and 14 distribution warehouses. The business serves customer locations from small stores to large retail outlets, according to a company spokesman.

As part of GE's customer service, the division receives orders at service operations located throughout the country, where they are edited and encoded for entry. Orders are entered into computers located here for further editing and are then batch transferred to a computer center in Boston, where they are scheduled and billed, the spokesman said.

Five of the 14 distribution centers support from eight to 16 terminals each and the remaining sites support one terminal each. The five major distribution sites are located in Charlotte, N.C.; Chicago; Atlanta; Edison, N.J.; and San Leandro, Calif.

To provide cost-effective computing services to their customers, GE Housewares-Audio installed a Digital Communications Associates, Inc. (DCA) data communications network, a DCA spokesman said. Terminal clusters at the five major locations connect to the host computer site in single phone-line connections.

The network is a "star" configuration that supports three host computers — two Digital Equipment Corp. PDP-11/70 Unibus-based computers located here and a Honeywell, Inc. 6000 mainframe based in Boston.

A DCA System 355 stand-alone master network processor serves as the central unit for the distributed data communications network. It transports data from any terminal port to any computer port in the network. Terminals and other DCA systems connect to the system in a point-to-point fashion, the spokesman explained.

All input is entered during the day and, in the event the computer goes down, the system allows the terminal operator to select an alternate port. The routing capability results in greater utilization of the network and operator productivity, according to the spokesman.

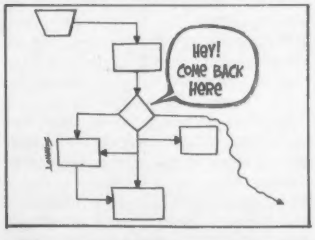
Attached to the system are four DCA System 205 Unibus interface statistical multiplexers with two multiplexers plugged into the slots of the Unibus of each PDP-11/70, according to Ed Chylinski, manager of sales, marketing and distribution information systems for GE Housewares-Audio.

At each of the five major distribution centers, there is a DCA System 115 statistical multiplexer, which can support up to 32 asynchronous devices. Currently, each site utilizes from eight to 16 2,400 bit/sec terminals. The System 115s connect in a point-to-point configuration to the System 355. Nine local terminals connect directly to the System 355, and an additional eight access it through dial-up connections, Chylinski said.

Part of the the Honeywell environment in Boston is a System 115 supporting 1,200 bit/sec computer ports. Terminal ports from the Honeywell operate at 2,400 bit/sec.

Within a year, GE Housewares-Audio plans both to incorporate an accounts receivable system on an IBM 4341 centered in Boston and to co-locate terminals with order-entry terminals. This requires installation of additional System 115s to be connected to the System 355. DCA is currently developing a protocol emulator to allow terminal users to access any of the four computers in the network, a DCA spokesman said.

According to Chylinski, the entire data communications network is designed for flexibility and has the capacity for future growth in terms of increased volumes, new subsystems and utilization of new technologies.



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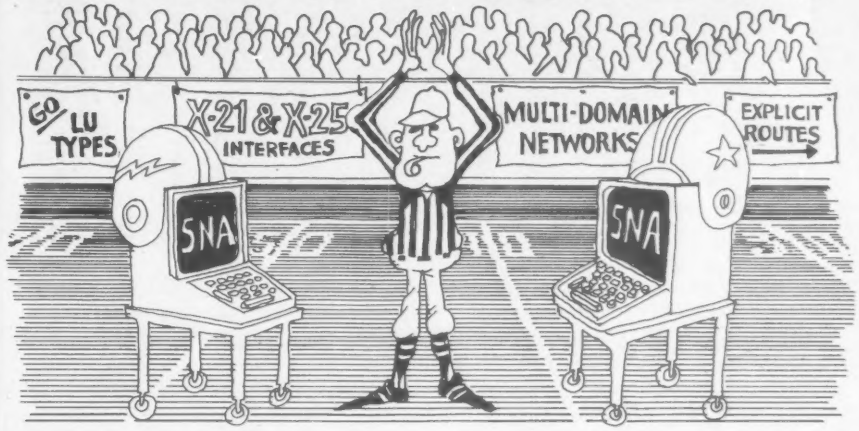

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Features Built-In Hard Disk

Vector Graphic 3005 Offers Quality, Low Price

By Hillel Segal
Special to CW‡

Offering a built-in Winchester hard-surface disk and incorporating the CP/M operating system, the Vector Graphic, Inc. 3005 has substantial capabilities at a low price. It gave a satisfactory performance in benchmark testing and is worth considering for business applications.

The 3005 is the second system by Vector Graphic tested in the Association of Computer Users (ACU) benchmark report series. The firm's first computer, the System B, was tested in our Series 1 reports, and that system's times are also shown in our current scorebox.

The tests are performed by the Business Research Division of the University of Colorado under contract to the ACU. Each system is run through a set of identical applications, including processor and disk-speed tests, business and scientific programs and a program-editor comparison. The full reports include many details of the system's features, documentation and the company's approach to user support. A telephone survey of system users is also conducted, and their responses are discussed.

The two tests reported here are applications for business and scientific usage, intended to check suitability for general-purpose data processing and intensive "number-crunching." The scientific/engineering program, Test C-1, solves a set of 50 simultaneous equations with 50 variables. The accounts receivable program, Test C-3, sets up 50 customer account files on the disk, then updates them in a random sequence before displaying a report on the screen.

Test Times

The Vector Graphic 3005 incorporates both a floppy disk and a hard disk, and both were tested. The time shown for the accounts receivable program in the scorebox is the hard-disk time — 2 min, 26.9 sec. Using the 5¼-in. floppy disk, the same program ran in 7 min, 45.6 sec. The hard disk time is about average for systems using a Winchester drive, while the floppy disk time is a little slower than average, but still within the satisfactory range.

The scientific/engineering test ran in 11 min, 34.1 sec, a mid-range performance. Most systems seem to run the test either in under six minutes or over 20 minutes.; the 3005 was one of the few that fell in the middle. Since the test uses no disk access, there is no separate time for hard vs. floppy disk.

The 3005 as tested cost $11,150, including a Qume Sprint 3 letter-quality printer. The 3005 without printer sells for $7,950 and is probably the lowest priced hard disk system on the market.

Included in the 3005 system are the Z80A processor, terminal and keyboard, 64K bytes of memory, the 5M-byte hard disk and a 630K-byte mini-floppy disk. The system has three parallel ports and one RS-232 serial port.

Standard software includes the CP/M operating system, Microsoft Consumer Products, Inc. Basic-80 language and several utilities. An excellent screen-oriented program editor is also provided.

Vector Graphic has changed its approach to hardware configuration slightly since its original model, the System B, was introduced several years ago. The System B used a dumb terminal connected to a unit containing the processor and disk drives. The 3005 and other more recent models incorporate the processor, memory and associated circuits in the terminal cabinet with the disk drives housed in a separate unit. With the new approach a user can start out with a lower priced system, upgrading the disk drives later.

The terminal includes a standard typewriter keyboard and a 10-key numeric pad (with no separate Enter key, however). The screen is a 12-in. gray-phosphor type, displaying 24 lines of 80 characters. It has reverse video capability but no graphics features. An alternate character or graphics set could be specially programmed and installed in read-only memory, if desired.

The hard disk drive is a 5¼-in. model with two platters made by Seagate. It has a total storage capacity of about 5M bytes. The floppy disk, made by Tandon Magnetics Corp., pushes that technology to the maximum, using quad density (double density in both tracking and sectors) and dual-sided operation. With a capacity of 630K bytes, it can be used for hard disk backup if the user is willing either to back up selectively or to use a number of disks for a complete backup.

For most operations, the hard disk is used exclusively. It runs quietly and is noticeably faster than the floppy.

Vector Graphic supplies two letter-quality printers for the 3005. Aside from the Qume, a NEC Information Systems, Inc. Spinwriter is also offered. It has the same 55 char./sec speed as the Qume, but uses a thimble-type printwheel rather than a daisywheel.

Other printers can be interfaced to the 3005. While not sold as a part of the 3005 system, many dealers can provide a package including the lower cost printer.

Using the CP/M operating system, users have 56K bytes available to them and can run a variety of languages and programs. Aside from the Microsoft Basic provided with the system, Pascal, Fortran, Cobol and other languages are available.

No less than three program editors are provided. The Microsoft Basic has its own built-in line editor, similar to other such editors that are provided with Basic systems. The CP/M operating system has an editing utility that allows search and replace operations throughout the program file, but it is still a line-oriented editor. Best of the three is Vector Graphic's own Screen-Oriented Program Editor (Scope), which allows the user to scroll through the program, automatically moving text in and out of the buffer. It has its own HELP command.

Advanced WP Software

Vector Graphic supplies several types of applications packages. Its word processing system is called Memorite III. It includes a spelling dictionary, automatic letter writing, mailing lists and other advanced features. However, the operator interface is rather hard to learn since it relies on control keys that are not prompted on the screen. Although a HELP command is provided, a set of stick-on key labels would help out greatly in this area.

The Execuplan program is Vector Graphic's answer to Visicorp's Visicalc, supplying the spread-sheet functions for management planning. A statistical package and a data management system are also available. For general accounting, the Peachtree Software, Inc. programs are supplied.

Users contacted during our survey were generally very pleased with the 3005. Many were doing some in-house programming as well as using canned packages. Microsoft Basic-80 was being used by all those programming; one user was also programming in Fortran. Memorite and Execuplan received mostly favorable reviews, as did the Scope editor.

The drawback most often cited was in the area of documentation — lack of introductory material for the first-time user.

Customers said hardware reliability and service were good, but about half noted they had start-up hardware problems. The system comes with a standard 90-day warranty.

We feel that it is a capable single-user system at a very reasonable price.

Hillel Segal is president of the Association of Computer Users, a nonprofit association with members in the U.S., Canada and several other foreign countries. A package of information about the Association of Computer Users is available from the group at P.O. Box 9003, Boulder, Colo. 80301.

SCOREBOX

System: Vector Graphic 3005
System Price: $11,150

SYSTEMS UP TO $25,000

	C-1 Scientific Engineering Time (min)	C-3 Accounts Receivable Time (min)
Pertec PCC 2000	28:48.4	6:04.3
North Star Horizon	12:01.9	1:57.7
Cromemco System Two	14:52.6	2:48.0
Texas Instruments 771	22:05.4	3:38.1
Vector Graphic System B	19:30.0	5:56.5
Decstation 78	7:55.7	4:21.5
Radio Shack TRS-80 Model II	20:00.7	3:38.6
Apple II+	21:11.0	6:17.4
Digital Microsystems DSC-2	13:24.9	3:28.8
Ohio Scientific C3-A	12:10.7	15:49.3
Alpha Micro AM-1011	5:18.3	3:25.3
Data General CS/10 Model C1	58:21.0	*
SD Systems SD-200	17:42.8	6:16.4
Wang 2200SVP	2:13.3	2:23.0
Altos ACS8000-15	7:54.5	10:41.5
Altos ACS8000-6 (hard disk)	7:54.5	1:35.1
NEC Astra 205	14:27.9	5:10.8
Dynabyte 5300	5:39.5	4:38.0
Billings BC-12 DF2M	21:48.6	5:09.2
Smoke Signal Chieftain 9822	3:13.3	1:40.7
Commodore CBM-8032	23:45.1	3:36.0
Vector Graphic 3005*	11:34.1	2:26.9
Xerox 820	to be covered	
IBM Personal Computer	in future issues	
IBM 5120		

* Tested with hard-surface disk rather than floppy. C-3 time was 2:40.3.

This is the 50th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

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Calendar

April 29-May 1, Dorado Beach, Puerto Rico — **Annual Mid-Year Meeting of the Computer Dealers and Lessors Association.** Contact: Computer Dealers and Lessors Association, Inc., 1212 Potomac St., Georgetown, Washington, D.C. 20007.

May 1-3, Denver — **Managing and Motivating DP People.** Contact: Carrie Solomon, Gary Slaughter Corp., 4810 Montgomery Lane, Bethesda, Md. 20814.

May 2-5, Kansas City, Mo. — **Association for Systems Management Annual Conference.** Contact: Richard B. McCaffrey, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

May 2-5, Chicago — **College and University Machine Records Conference.** Contact: University of Illinois, Administrative Information Systems and Services, Box 4348, Chicago, Ill. 60680.

May 2-5, Chicago — **Accountability: A Positive Approach to Credibility.** Contact: Joseph A. Catrambone, General Chairman, Cumrec '82, Box 4348, Chicago, Ill. 60680.

May 2-5, Kansas City, Mo. — **The Systems Planning and Principles of Productivity.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

May 2-6, Raleigh, N.C. — **Associated Public-Safety Communications Officers 12th Annual East Coast Regional Conference.** Contact: Associated Public-Safety Communications Offices, East Coast Regional, 2012 Eagleton Circle, Raleigh, N.C. 27609.

May 3, Boston — **CICS Macro Level Coding.** Contact: Computer Education Services, 739 Boylston St., Boston, Mass. 02116.

May 3, New Orleans — **Society of Telecommunications Consultants Spring 1982 Spring Conference.** Contact: Society of Telecommunications Consultants, Suite 1410, 1 Rockefeller Plaza, New York, N.Y. 10020.

May 3, Rochester, N.Y. — **Introduction to APL.** Contact: I.P. Sharp Associates, Inc., 1200 First Federal Plaza, Rochester, N.Y. 14614.

May 3, Phoenix — **APL Software Engineering.** Contact: I.P. Sharp Associates, Inc., 1200 First Federal Plaza, Rochester, N.Y. 14614.

May 3-4, Washington, D.C. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

May 3-4, Pittsburgh, Pa. — **Fundamentals of Data Processing and Telecommunications.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

May 3-4, Washington, D.C. — **Word Processing Implementation Workshop.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

May 3-4, San Francisco — **Information Engineering Overview.** Contact: Information Methods (U.S.A.) Corp., 504 Totten Pond Road, Waltham, Mass. 02154.

May 3-5, Kansas City, Mo. — **Fundamentals of Data Processing for the Non-Data Processing Executive.** Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020. Also being held in New York, May 3-5.

May 3-5, New Orleans — **35th Professional Development in the Use of Computers in Engineering, Planning and Architecture.** Contact: Patricia C. Johnson, Executive Director, Cepa, Inc., 358 Hungerford Drive, Rockville, Md. 20850.

May 3-5, Washington, D.C. — **Planning an DP Disaster Recovery Program.** Contact: Computer Security Institute Educational Resource Center, P.O. Box 528, Matawan, N.J. 07747.

May 3-5, San Francisco — **Basic Project Management: Planning Scheduling and Control.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

May 3-5, Dallas — **MVS Systems Management Workshop.** Contact: Sondra Schwartz, Boole & Babbage Educational Services Division, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

May 3-5, Toronto, Ont. — **Pride Users' Association.** Contact: Pride Users' Association, Inc., 1248 Springfield Pike, Cincinnati, Ohio 45215.

May 3-5, Chicago — **Screen Design.** Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181 Wellesley, Mass. 02181.

May 3-5, San Francisco — **Data Communications.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

May 3-5, New York — **DL/1 Applications Programming.** Contact: Ilene Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

May 3-5, Piscataway, N.J. — **Vsam Coding for Higher Level Languages.** Contact: Ilene Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

May 3-6, New York — **CICS Application Design.** Contact: Sysed, 1 Park Ave., New York, N.Y. 10016.

May 3-6, St. Louis — **Micrographics: New Importance for the '80s.** Contact: National Micrographics Association, 8719 Colesville Road, Silver Spring, Md. 20910.

May 3-7, Boston — **Systems Analysis Workshop.** Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Read All About It In Computerworld's Special Report, "Increasing People Productivity"

The rapid growth of computer technology continues unabated, and people in the DP/MIS industry need to grow with it.

In our April 26 Special Report, edited by Marcia Blumenthal, we will take a look at the different options available for increasing people productivity — from technical to organizational. On the technical side, you'll read about the use of nonprocedural languages and how to get a more rigorous design for information systems. And on the organizational side you'll learn how MIS executives are incorporating psychology with technology to increase productivity. There's alot of interest in programs for training, motivation, and aligning the DP department's goals with those of the company.

No matter what your job function is in the DP/MIS field, you'll want to know what's out there to increase both your personal productivity and that of your employees'. You'll get all the answers from the most up-to-date information.

And if your products or services will increase people productivity, here's where you'll find your customers, reading *Computerworld's* Special Report, "Increasing People Productivity". Ad close is April 16. Contact your local sales representative or Frank Collins at (617) 879-0700.

COMPUTERWORLD

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Turnkey Helps Bank Plot Real Estate Ventures

FRESNO, Calif. — Time was working against Guarantee Savings and Loan Association here. It needed a computer system up and running in under six months from a cold start.

"If we had tried to modify existing software, we'd still be in the system design stage. To get rapidly into real estate development, we had to find a turnkey system," according to Charles Torbit III, vice-president and corporate systems manager at Guarantee.

The financial institution wanted computer support to expand its land development and home-building activities. For a while, Guarantee considered using the three computers operated by its service bureau subsidiary for its burgeoning construction accounting business. But the software on those computers was dedicated to the traditional lending functions of savings and loan and was unsuited to handle the needs of the Real Estate Development Department.

Guarantee soon found that it was more practical to purchase a minicomputer and packaged software for those real estate functions than to develop programs for the existing computers performing its savings and loan processing.

The search for a solution led Torbit to Computer Work Systems, Inc., a consulting company that recommended the Residential Contractor Business Management System from The Office Manager, Inc. (TOM) of Seattle, Wash.

In March 1981, Guarantee installed the TOM system, which reportedly provides job estimates, project costing, labor utilization, materials management, supplier commitments and financial management. The software runs on Wang Laboratories, Inc.'s 2200 MVP minicomputer with a magnetic disk storage unit, three video display terminals and two printers.

Using 75% of Reports

Less than six months after installation, the real estate department was utilizing about 75% of the reports the system was generating, according to Mike Evans, Guarantee's minicomputer programmer/operator.

System data is transmitted over phone lines from Guarantee headquarters, where the hardware is located, to the real estate division, about 10 miles away. Before the Wang was installed, couriers would run the materials back and forth between the two offices. System users at the real estate end now have on-site processing power and are enthusiastic about the system's performance.

"We have more information available to us, such as cost analysis for all disbursements on a house, that we never had before," operations supervisor Barbara Stewart said. "We also have it a lot faster. We used to spend five days to calculate monthly interest and post it to the appropriate journals each month . . . we can now do it in a day," she claimed.

Stewart also noted that accuracy has been improved with the new system. "With the manual system, you'd be off a few thousand dollars and discover the error months later. We don't have that happen anymore."

Altering Software Readily

Another reported plus about the TOM system is its Speed applications development utility, which allows programmers to alter the software readily. Evans has already customized portions of the modules to meet specific needs at Guarantee.

In conclusion, Evans pointed out that "Guarantee's Advance Loan subsidiary, which makes consumer loans, is still totally manual. We'll put them on-line to process late notices, payment received, billing notices and so forth.

"Advance Leasing, another subsidiary, also needs help. We've already ordered a TOM accounting module to handle their fixed assets and depreciation schedules. After that, we may get into inventory control for the company or stockholder information."

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Videotex '82 Slated for June

NEW YORK — "Videotex '82," a three-day conference sponsored by Online Conferences, Ltd. of England, will focus on the electronic publishing industry June 28-30 at the Hilton Hotel here.

Exhibitors at the conference will include AT&T, IBM, Nippon Telephone and Telegraph Corp. Prestel International, Intelmatique and Telidon System.

Topics at the conference will include: how to make money out of the new technology, who will use videotex and what information they will want, how to enter the videotex marketplace, advertising implications, how videotex and teletext will affect traditional forms of communications (print and TV) and what the role of cable in the new information technology will be.

Registration paid before March 31 is $650/person and $750/person after that date.

Registration forms are available from Meeting Systems, Inc., Suite 809, 286 Fifth Ave., New York, N.Y., 10001.

Interface '82 'Locknote'

Use of Computers Predicted to Improve Life

By Phil Hirsch
CW Washington Bureau

DALLAS — Increasing computer usage will lead to a significant improvement in the quality of human life, Charles P. Lecht told attendees at Interface '82 recently.

Lecht, president of Advanced Computer Techniques Corp. and author of *The Waves of Change*, gave the "locknote" address that officially ended the conference here. He began by taking a slap at critics of technological change.

"What the lever was to the body, the computer system is to the mind," Lecht said. "It is not difficult to visualize a time when people rebelled against the idea of augmenting bodily power by means of physical devices ... but history has provided no evidence to suggest that our bodies would have been any more powerful had we not had the benefits of mechanical leverage."

Computing power must be distributed widely before it can become a significant societal force, Lecht said, indicating that this goal was reached by the late '70s. "Computer systems power and the means for its delivery ... could be obtained virtually everywhere."

Along with geographic expansion has come internal integration — what Lecht called "the synthesis of communications and computer systems technologies." One result has been "a fantastic increase in our capacity to deliver artificial intelligence to the human brain ... There is no evidence that anyone could ever be able to manipulate megabytes of data flawlessly without the power provided by technology."

This increase in human cognitive power should enable blue-collar and white-collar workers to work in "more symbiotic harmony" by the end of the century, Lecht said. The growth of computer networks would also reduce the need for travel, he added. "And if the need for travel is greatly reduced, so, too, can the energy required to sustain our places of work be greatly reduced. Imagine a New York City with increased productivity, decreased congestion — a cooler Big Apple."

In the 1980s, Lecht said, advancing computer communications technology will put "a screen on one wall." By the 21st century, there will be "a holographic wall." He also predicted that use of paper in the office would decrease to the vanishing point by the 21st century.

The office secretary will, in the 1990s, "be elevated to master of the office command and control center," Lecht added. He also predicted that holography would add a new dimension to teleconferencing in the 21st century by bringing two physically separated groups "together at one table in one room with diminished perception of dislocation."

Meanwhile, use of portable telephones will grow in the 1990s, and in the 21st century, "the need for a plugged-in device will be replaced by ... voice and image projection/reception systems invoked on demand and appearing in our minds, ultimately via LSI [large-scale integration] engineering techniques applied to the inmost machinery of the human cell through artificial neuronal interconnections."

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See Page 16

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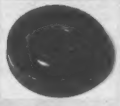

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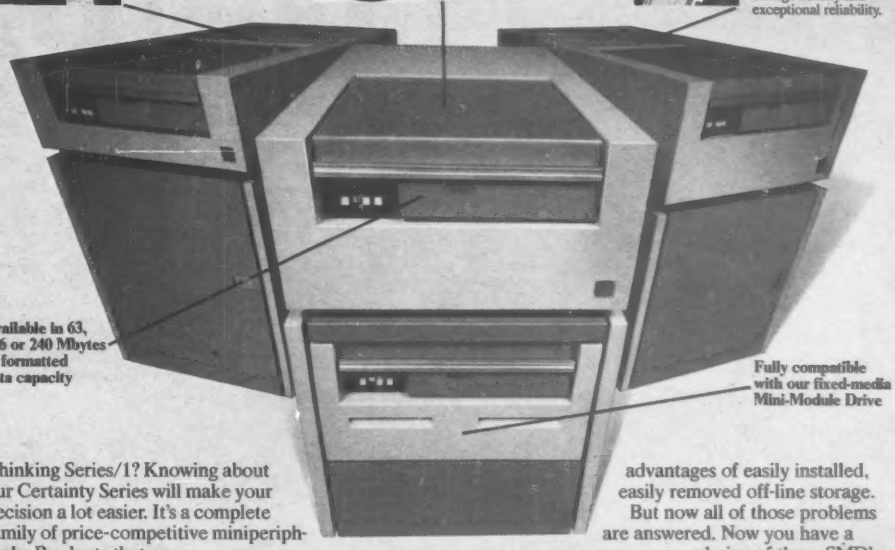

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CONTROL DATA

Addressing society's major unmet needs as profitable business opportunities

Terminal-Based Data Network Serves as

By Jack Rule
Special to CW‡

ORANGE, Calif. — One of the most critical applications for terminal-based networks is public safety. Law enforcement data networks operate around the clock to provide local officers with instant information concerning motor vehicles, stolen items, wanted fugitives and so forth.

In Orange County, Calif., CRT terminals are playing a vital role in handling data base record checks for local police departments. Operating with specialized hardware and software, the Orange County Justice Information System keeps track of local records and also provides access to state and national law enforcement data bases.

The vital link in the county network is the communications center (control one) located here, where radio calls are received and terminal inquiries are entered into the various computerized data bases. When an officer in a radio car stops a vehicle, a request for information about the auto or the driver must be handled with minimal delay to protect both the officer and the rights of the motorist.

When a request for a want/warrant check is received by the communications coordinator at the center, the pertinent information is recorded and the information is passed to a CRT terminal operator. The identifying data is entered into the terminal and within seconds a response from one of the several justice data bases is flashed on the terminal screen.

The operator then keys in the identifying number of the police vehicle and the information appearing on the screen is printed out at a small printer in the police car. Normally the complete inquiry takes less than one minute and the officer has the vital information that will help to determine what the next step should be. In police cars not equipped with printers, the data on the CRT screen is printed out at the communications center

Try it on for size.

Informant for Orange County Police Forces

and then is relayed by voice radio to the officer.

The Orange County computer network was operating with AT&T's Dataspeed 40/3 video terminals. The Dataspeed terminals had been installed as an upgrade to earlier teletypewriters when the number of records handled by the communications center jumped from 35,000 to more than 110,000 per month. The network operated with a switching computer from Motorola, Inc. that was operating near its maximum capacity in routing inquiries to the various data bases available to public safety agencies.

Upgrade Needed

As local law enforcement departments continued to escalate their data base inquiries, it became evident to the specialists in the county communications division that the network would have to be upgraded.

After an extensive evaluation process, a message-switching processor from Tandem Computers, Inc. was installed with customized applications software written by Computer Sciences Corp. This increased message handling capability at the communications center, together with the heavier demands of local police departments, caused traffic to jump to more than 2 million messages processed monthly.

As the network expanded, the Communications Division under its chief, Don Poorman, searched for ways to cut operating expenses. A major network expense came from the telephone company's video terminals. In view of the specialized features of the system only plug- and line protocol-compatible replacement could be considered. After issuing a request for proposals, five vendors were considered by the county communications technical staff to replace the Dataspeed terminals.

An intensive on-line test of available terminals was conducted for a six-month period, according to engineering and technical services specialist Len Holt. During that period, the Racal-Milgo, Inc. 40+ CRT terminal was found to have all "the operative features that the users needed. It was a terminal they could become familiar with and use. This was an easy transition because the keyboards were almost identical," he said. Physically, it was possible to unplug a Dataspeed 40 and plug in a 40+ without other requirements.

Overriding Consideration

But the overriding consideration was the Racal-Milgo claim that "they could save us about $500,000 over a five-year period compared to telephone company rates," Fred S. Preble, the county training officer, explained.

Although the 40+ provided an important solution back in 1978, Preble said that increased message volume on the network has led to some problems. With the county message switches handling well over 2.2 million messages per month now, operating problems have become higher than tolerable on the 40+ output printers. The terminal printers were designed for typical business usage of eight to 12 hours daily and apparently not the 24-hour operation of a public safety net, Preble said. "Those little printers have done admirably, but the things are tired."

To correct the increasing printer maintenance problems, Racal-Milgo has proposed an upgrade to the more advanced 4010 CRT terminals that include heavy-duty output printers. According to Holt, the 4010 has "somewhat more advanced technology and better built hardware. We think the maintenance on the new terminals will be far less than we're experiencing on the 40+." With an estimated 75% to 80% of all service calls now attributed to printer malfunctions, Holt expects to eliminate 90% of these troubles with the new terminals.

A final decision on upgrading to the 4010 CRT terminals will be made after an on-line trial of the new units is completed early this year.

The county network includes more than 80 CRT terminals — many of which are located at local public safety agencies as well as at the communications center. The planned upgrade will increase the number of display terminals to nearly 100.

The Orange County network operates at 1,200 bit/sec using 3002-type voice-grade lines with C-2 conditioning. The net operates with 202T data sets supplied by the telephone company and Holt said that he expects two-hour maintenance on these units. The telephone company gives high priority to public safety operations and most of the time they respond within the two-hour maximum, he explained.

Compared to its original "torn tape" system, the Orange County communications center has come a long way. When record checks first had to be cut on tape, an answer often took as much as two to four hours to come back to a local police department. Today, an officer can get the latest data in about 60 seconds.

Rule is senior product manager at Racal-Milgo, Inc. Computer Products Division in Miami.

Prop up this magazine against your IN Box and you'll get a good idea of how the new HP 2382 office display terminal would look on your desk. It's that small!

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The 2382 is really a full-capability terminal—with "big terminal" features like screen-labeled soft keys, block mode and local editing. But its compact and pleasing design makes it as easy to accommodate on the office desk as the telephone. And it's almost as easy to use.

The detached typewriter-style keyboard has a coiled cord that won't interfere with the desktop work area. And the keys have a sculptured profile and a velvet finish for a friendlier feel. There's even a deep-dish touch on the "F" and "J" keys for easy location of the "home row."

The HP 2382 works with computers from most major manufacturers. But no matter what system you use it with, it's backed by HP's worldwide service organization. *And* our reputation for high-quality products.

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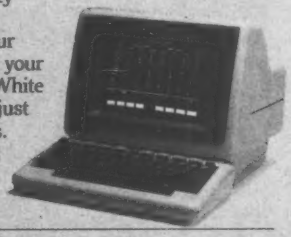

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Apple for Teacher? Foundation Gives $125,000 Worth

CUPERTINO, Calif. — Apple Computer, Inc., recently awarded approximately $125,000 worth of microcomputer systems to schools and educational institutions around the country for software program proposals.

Since 1979, the Apple Education Foundation, in cooperation with other companies, has awarded computer equipment amounting to $750,000 to schools and other institutions for instructional development.

Grants are awarded for promising software program development projects at preschool, elementary, junior high, high school and university levels. Special education software in foreign languages, vocational, library, museum and medical or health science training have also received grants.

Other companies contributed money, equipment or service support to the foundation.

CAD/CAM

TOMORROWS TECHNOLOGY TODAY AT MCAUTO

MCAUTO (McDonnell Douglas Automation Company), a division of McDonnell Douglas Corporation, which ranks among the top computer-using corporations in the world has excellent opportunities in St. Louis, Southern California and selected metropolitan locations for experienced professionals with CAD/CAM experience in the following:

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MELBOURNE, Australia — BPMS, one of this country's largest private pathology services, decided a few years ago that computerization was the only solution to a large number of problems it was encountering in the management of its services. As a result, BPMS implemented an advanced computer network for laboratory-reporting and patient-billing applications.

The service provided by BPMS is used by about 4,500 doctors in the metropolitan area here. It has 30 collecting centers, including eight peripheral laboratories, a BPMS spokesman said.

A communications network linking the computer, the central laboratory and the peripheral laboratories uses dial-up and dedicated lines with multiplexers when appropriate, the spokesman said. It services eight hospitals, totaling about 1,200 beds.

The system is based on a Data General Corp. Eclipse C/330 Information System with a core memory of 256K bytes, a BPMS spokesman said. The configuration includes two 192M-byte drives, one tape drive, 17 printers and 25 visual display terminals.

Problems Before Computerization

The three partners of BPMS labs found that before computerization the management problems included:

- Difficulty in producing consistently accurate patient accounts, with undercosting a frequent occurrence.
- Achieving satisfactory financial control over the patient billing: Some services were never billed.
- Handling the laboratory work flow and monitoring the progress of patient episodes (lab testing).
- The possibility of transcription errors in processing lab output.
- Responding efficiently to inquiries into patient accounts and lab reports.
- Economic and competitive pressures demanding better service, while containing or reducing costs.

The lab management and reporting module of the system handles a patient load that peaks at about 800 episodes per day, a spokesman said.

The peripheral input capability is used to effect registration of as many patients as possible prior to the arrival of the specimens at the central lab, thus minimizing peak overloading.

Specimens are identified by a computer-generated episode number, sorted and dispatched with an internal request form to lab departments, where work sheets are generated by the computer system.

Following the release of results, data is passed on slips attached to the internal request form for entry into the systems data files to departmental terminal operators. As results are keyed, extensive checking of the information reportedly takes place.

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Adaptable, Trouble-Free

BPMS considers the new system trouble-free and has the added advantage of enabling office staff to adapt quickly to operating the system. It is no longer necessary to use skilled medical typists.

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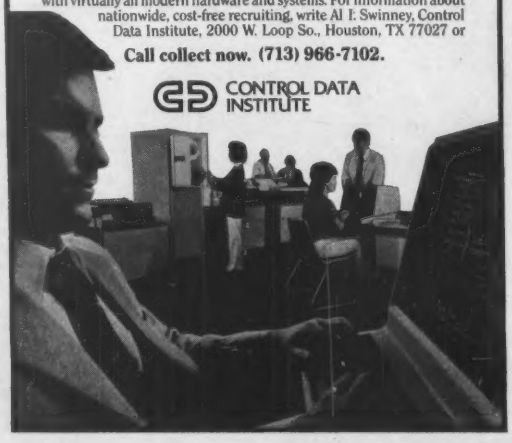

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EDITORIAL

Mainstreaming DP

The suggestion that programmers are overpaid, immature and should be part of the user department of their organizations has hit a tender chord among the readership of *Computerworld*.

Many readers interpreted the remarks of Thomas Francl, who spoke at the Computerweek conference last month [CW, March 15], as a call for the elimination of the DP professional. However, much of what Francl's somewhat tongue-in-cheek presentation advocated was the elimination of DP as the ivory tower of the organization.

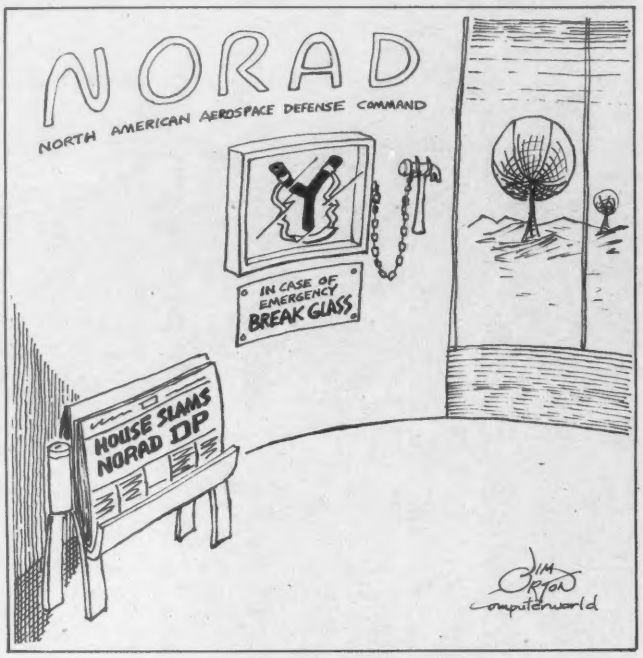
The importance of integrating the DP department with the mainstream of the corporation's activities is a harangue heard almost ad nauseam on the conference circuit these days. It appears that most DP executives agree with the need for such a realignment. However, talking about change is easier than making change.

Change is a painful and disruptive process. In this case it requires altering the way the DP department has functioned in an organization, and it probably involves a change in the way the DP professional does his job.

DP professionals are not alone in discovering they have to change their work patterns or environments. In the last few years, white-collar workers, both clerical and professional, have had to adapt to integrating computer technology into their work environment. Although in the beginning there was much moaning and groaning and talk of 1984 in these circles, the presence of computers has generally been accepted.

With all their talent and expertise it shouldn't be an insurmountable task for the DP professional to join with the end user in developing systems that will benefit the organization. Yet, even jokingly, some DPers view the end user as the enemy. "If we could just get rid of the end user our systems would work fine" sums up this attitude.

Those who are most susceptible to having their patterns of behavior altered are often the most sensitive to criticism. But those who are unwilling or unable to adapt to today's corporate environment will find themselves left behind.



DATA PAST

Five Years Ago
April 11, 1977

ATLANTA — IBM took the plunge and unbundled operating software from the hardware price of the System 34 announced here by its General Systems Division.

At the same time, however, the firm placed several functions previously contained in operating software into microcode on the system, billed as a disk-based, on-line business system that could accommodate multiple workstations and multiprogramming.

— — —

SANTA FE, N.M. — The State Department of Automated Data Processing here ran through five directors in the past two years because of a "helter-skelter" management policy and a lack of any management understanding from the present administration, according to sources.

The most recent resignation was that of director Gerald Gingras, who quit after three months on the job because he was ordered to hire a state legislator's son as a deputy director.

Ten Years Ago
March 29, 1972

WASHINGTON, D.C. — The Army was "unwilling or unable" to ensure the complete elimination of information it compiled in its data banks on civilian dissent, former Sen. Sam J. Ervin (D-N.C.) charged before the Supreme Court.

Ervin, who argued in the case of *Tatum v. Laird* before the court, charged that the data bank operations of the Army were "overboard in concept and not controlled in operation."

— — —

WARRINGTON, Pa. — The only independent vendor to offer 256K bytes of core on an IBM 360/30 was prepared to maintain any mainframe equipped with its memory extension if problems with IBM service arose.

Computer Hardware and Consultants also announced the availability of the 4768 double-size (512K) 360/40 memory, that may save the user up to 70% on a purchase basis, in addition to the quadruple-size 3768 for the 360/30.

LETTERS

Suggestions for Solutions

"Execs: Programmers Are Overpaid, Immature" [CW, March 15] has caused an unduly negative response due to misinterpretation and omission. Taken out of context, some statements are not only inflammatory but preposterous. We did not suggest, for example, that the solution to the programmer shortage is to eliminate the DP department.

Rather than concentrate on supply-sided solutions to the shortage, DP managers should concentrate on demand-sided solutions, specifically:

- Systems development should include the user as a *full* partner.
- Use more microcomputers and let the user program them himself.
- Hire more problem-solvers (analysts).
- Let the users prioritize and lead projects.
- Become a provider of tools rather than a godfather.
- Become an agitator of change within your own department.

Successful execution of these suggestions will, over time, eliminate the infamous DP bottleneck to the extreme of even eliminating most of the DP department. This will not happen overnight, but will evolve to this state during the next decade.

The reference to salary levels needs clarification. We stated that programmers frequently earn more than user department management, thus causing resentment from the end user.

Rather than end up with $100,000 programmers in 1990, management information systems (MIS) managers should look toward a world that emphasizes the role of the end user as an intelligent entity who is not only no longer afraid of the computer, but probably has a few at home.

Our talk was designed to stimulate discussion both pro and con. Most of the reaction to the article has been overly negative due to its misplaced emphasis. Our purpose was to outline the ills of our industry as seen by the end user and not to condemn the programmer.

After all, is the goal of MIS to meet our customers' (users') needs or our own personal wants?

Thomas J. Francl
Arcadia, Calif.

Management's 'Perception'

I am not surprised at Victor A. Casebolt's perception of "top management" in "View Self as General Manager, DPers Urged" [CW, March 8].

I have had enough jobs with different kinds of organizations and suffered enough exclusions from making data processing a functional part of the company vs. a service department to question Casebolt's theories.

As an example, I worked for a large manufacturing/sales company for 17 years and I contributed the best possible management information in all areas.

I was never included in short- or long-range planning or advised of changes or additions to the operations of the company.

Several months after changes occurred, I would find out about them and have to go in and convert primitive green eyeshade clerical systems over to the automated methods under considerable personal duress because I had no "top management" support.

I left the firm when I was told, far too late in the game, that they didn't "perceive" data processing as a part of the functional company. To top it off, they couldn't "perceive" a DP person ever becoming a part of the company management.

There are many more cases worth citing, but suffice to say that the role of the DPer should improve in proportion to the improvement in "top management's" perception.

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READER COMMENTARY/Terry Louth‡

Data Dictionaries and DBMS Dependence

Data dictionary and directory systems are the vogue today and controlling data as a "corporate resource" seems to have become the byword for those in data base management.

But what does this truly mean and how well do the various data dictionary offerings meet this objective?

As reported in "Data Dictionary: Role Widening" [CW, March 22], there are several commercially available data dictionary and directory systems on the marketplace.

'Those data dictionary/directories that extoll the virtues of DBMS "independence" are also somewhat limited. Their "do it yourself" approach provides users with the means by which to declare their own systems structure.

'Because of this, their component definition capabilities can, at best, be described as "loose."

'As a consequence, applications cannot be easily shared or exchanged by fellow users of the dictionary. Despite their claimed "independence," you will not find one data dictionary/directory that is being effectively used without a DBMS.'

Relation to DBMS

Experts claim that the various dictionaries differ in one fundamental respect: their dependence on or independence from data base management systems (DBMS).

The "dependent" data dictionary/directory is restricted to a particular DBMS. As such, it can address only a small portion of the corporate data base.

These dictionaries concentrate on the physical description and use of data within a direct-access device. They cannot effectively track data throughout an organization since they do not properly address people, procedures, events or nondirect-access-type files. In other words, the dependent data dictionary/directory's perspective of information systems is somewhat limited to the four walls of the computer room.

Those data dictionary/directories that extoll the virtues of DBMS "independence" are also somewhat limited. Their "do it yourself" approach provides users with the means by which to declare their own systems structure. Because of this, their component definition capabilities can, at best, be described as "loose."

As a consequence, applications cannot be easily shared or exchanged by fellow users of the dictionary. Despite their claimed "independence," you will not find one data dictionary/directory that is being effectively used without a DBMS. They allow you only the ability to migrate from one DBMS to another (usually within an IBM shop) with minimal difficulty.

According to data base experts, data dictionary/directories are slowly evolving and becoming a much more comprehensive product. These experts envision the dictionary being integrated into a systems design methodology, able to generate job control language, having the ability to perform both logical and physical data base design, automatically designing and documenting information systems and generating program job streams.

This, they contend, will be the wave of the future and will not be realized for another five years. However, there is one product on the market today that already performs these functions, the "Pride" Information Resource Manager (IRM).

The IRM is the software cornerstone of the Pride Automated Systems Design Methodology (ASDM), which is a product of M. Bryce & Associates, Inc. (MBA) of Cincinnati, Ohio. MBA created the IRM in 1974 (originally called Logik) to alleviate the data management activities in its original Pride system (a manual method at the time).

The company felt that in order to perform systems design effectively, an automated "where-used" tool would be necessary to keep track of both systems and data components.

MBA designed the IRM to be logically independent of both DBMS software and the computer. In fact, multiple DBMS can run simultaneously under the IRM.

It is also operational on more than 20 different configurations, including IBM, Honeywell, Inc., Burroughs Corp., Hewlett-Packard Co., Digital Equipment Corp., Data General Corp., Sperry Univac, Control Data Corp., ICL, Inc. and IBM-compatible machines.

When building the IRM, MBA implanted all of the Pride rules for systems design within it. As systems developers follow the phases and activities in Pride, they enter component definitions into the IRM which, in turn, checks them for completeness and nonredundancy. It assures that all of the components are properly defined and related before moving on to the next phase of design, making it an effective tool for quality assurance.

Special Features

The IRM also has special features that allow it to monitor and analyze a corporate systems plan for an organization, and DP auditors use it to track control points in an information system.

Its impact analysis feature provides developers with the ability to analyze the impact of a proposed change to a component before it actually occurs.

Coupled with MBA's Automated Design Facility, the IRM enables analysts to concentrate on the proper specification of information requirements as opposed to technical considerations.

The software then analyzes relevant data flows and structures and renders a design for the entire information system along with the logical data base.

If an existing system can accommodate the specifications, then it may suggest a modification to it.

Universal Data Definition

In an attempt to standardize on data component definitions, the North American Pride Users' Association, Inc., a vendor-independent users group, is supporting a project for universal data definition (UDD).

Through the UDD project, Pride users hope to standardize on logical data, record and file descriptions, thus allowing Pride users to share integrated applications.

Under the Pride approach, developers concentrate more on the critical "front end" of systems development, which is still the exception rather than the rule in most DP shops.

Because of this, it is not surprising to find that Pride ASDM is not very popular with the technocrats of the industry.

Louth is a senior information resource analyst with Ontario's Ministry of Consumer & Commercial Relations in Toronto and president of the North American Pride Users' Association, Inc.

HUMAN CONNECTION/Jack Stone‡

The Making of a Systems Analyst: Learning to Negotiate With Users

There are many aspects to the systems analyst's job that are challenging, some that are very difficult and a few that are downright scary.

In the last category is the problem of having to deal with the demanding user — like Ira Schoen — who, by the time the system is installed, will surely drive an analyst — like me — crazy.

So imagine my thrill when at the initiation of Ira's systems development project he accepted the task of negotiating with the users for a data structure to support his new minisystem.

This is Part 8 of a continuing series on new users learning to cope on the job.

Self-Preservation

My initial motivation for making the suggestion was primarily one of self-preservation. Had I taken on the task, I foresaw the possibility of a never-ending stream of requests from users — and from Ira — to make changes in the system. And I was stuck with a fixed-price contract!

But after a while, it dawned on me that maybe the idea wasn't all that shabby.

When you really get down to it, the most significant job of the analyst (assuming that systems design is handled separately) is to get a master record designed and agreed to by the users.

Ira certainly had the brainpower to handle this task, and the job — in concept — was really rather simple. I described it to him this way: "All you have to do is make a list of data fields that you want to track and get a handle on their maximum lengths. Also, we need some narrative on field definitions."

Why shouldn't users like Ira handle the analyst's function? For one, Ira possessed a stock of relevant experience that I didn't: He knew his users well and worked effectively with them. He also reported to and had the full backing of the executive office within the user organization, which gave him a lot more power than the typical DPer has.

Further, he was one sharp cookie — a bright, articulate, assertive fellow who was determined to get a difficult job done and done right. Surely there is analyst potential among the users in every organization.

Ira's only failing, which is probably too strong a term, was his lack of experience in computer-based business systems.

He tended to rush to a DP judgment using common sense instead of the tempering that wizened-up DPers evolve after years of practical experience. And we DPers know how little trust we place in the application of common sense to systems development.

Of course, I didn't let him in on the little secret that we all know about.

Whether it's due to new perceptions or systems experience or changing environments or just plain vacillation, it is a well-known fact that during the course of a systems development project users change their minds about what they want in a master file — sometimes inserting and tossing out the same field repeatedly. (Hence, the derivation of the expression "crazy, mixed-up user.")

I began to wait anxiously — if not gleefully — for the momentous day when Ira returned from his first encounter with an ultrademanding user.

Letters to Stone should be addressed to him at Box 270, 1377 K St., N.W., Washington, D.C. 20005.

LETTERS

'Arrogant and Incorrect'

In response to Donald F. Nelson's reader commentary "Critics of Proposed Cobol Standard Should Examine Advantages Before Rejecting Plan" [CW, March 15], I'd like to say that it is both arrogant and incorrect to assume that those of us who oppose the "all-or-nothing" approach of the new Cobol-80 standard are uninformed and/or have not performed any analysis.

The detailed analysis done by the Data Processing Management Association (DPMA) committee and provided to those of us who wanted it was very thorough. It provided me with the opportunity to look at which of the various conventions and changes would affect my programs and require recompilation at the very least.

Many of us used the letter provided by Joseph T. Brophy or the DPMA to voice our opposition simply because we are very busy and saw no reason to recreate the wheel. The work and wording had already been done quite adequately, and my analysis showed that the work and wording was valid.

No one I've talked to thinks that all of his programs have to be rewritten, but just exchanging for the newly reserved words and recompiling can be a major undertaking in CPU and downtime. Nor do we think we have to implement it as soon as possible. We do, however, think that the future modification or enhancement of existing Cobol-74 packages will be a problem in the near term (one to two years).

Looking at the Cobol-80 as a standalone, new language, it has quite a good architecture and good features, consistent with today's understanding of languages.

Is it better than PL/I, Pascal or the proposed Ada languages? I have not had time to perform a comparative analysis, but I'd like to raise the question as to whether Cobol-80 is needed in its proposed form and format with these other alternatives.

It is of course apparent to just about everyone who has used it that Cobol-74 needs some revision to make it easier to use and especially to modify, but perhaps something that can be implemented in phases or stages would be preferable.

Linda T. Taylor
Director
Information and
Management Systems
Filmways, Inc.
Los Angeles, Calif.

Undeserved Reputation

In response to "Execs: Programmers Are Overpaid, Immature" [CW, March 15], unfortunately, California programmers may be earning a bad name because of great demand resulting in high turnover, but this is not so everywhere. The majority of hardworking programming professionals do not deserve this bad reputation.

The suggestion that user departments create application programs themselves using software tools now available is not feasible.

As a programmer, I have had recent experience with one of these user-friendly, English-like, powerful languages. After reading three technical manuals and some experimentation I am impressed with the software. However, I cannot imagine anyone in our busy user department taking time to do the same.

Even though they are good at what they do, they do not have the same aptitude or the desire to learn a programming language. Why should they? That is what programmers are for.

These software tools are to make programmers more productive so their valuable time can be used more efficiently, not to turn users into programmers.

Leslie Herbein
Programmer/Analyst
Electro-Space Fabricators, Inc.
Topton, Pa.

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LETTERS

Bitter Truth?

Charlene and Thomas J. Francl in "Execs: Programmers Are Overpaid, Immature" [CW, March 15] reveal a bitter truth: Unlike most people, computer programmers are heavily motivated by money.

In stark contrast, money means little to Charlene Francl, an assistant vice-president at Security Pacific National Bank, who is palpably indignant that programmers often "make more than assistant vice-presidents at banks" — or to Thomas Francl, whose own deep sense of company loyalty inspired him to start a consulting firm.

Users take heed: Why employ programmers when you can find such paragons as these to solve your problems for you?

Scott Burleigh
Burleigh, Inc.
Los Angeles, Calif.

'Unprofessional'

I take great exception to "Exec: Programmers Are Overpaid, Immature" [CW, March 15]. To summarily categorize all programmers as "sick adolescents" is totally unfair and unprofessional.

In any profession where there is a greater demand for services than there are people to supply those services, there inevitably will be certain individuals who take advantage of the situation.

While I have only worked in small computer departments, the programmers I have worked with tried their best to complete projects on time and to specifications. Most late projects were caused by changing specifications or operational difficulties.

In my present position, most projects are done on or before the estimated date. Those not done by the estimated date were usually displaced by more important projects.

Charlene Francl's observation that programmers are primarily motivated by money is highly questionable. Articles in previous issues of *Computerworld* have directly refuted this assumption.

Personally, money is only one motivation. Just as important is a challenging working environment and potential advancement.

I would not stay in the best-paying job in the world if it were boring and dead end. It should be noted that certain industries employing programmers, primarily banks and insurance companies, are notorious for their poor level of compensation.

The one point I can agree with in the whole article is that more general analysts are needed in DP departments. Perhaps the Francls should have emphasized this more instead of running down programmers.

Lee McAllister
Lead Programmer
Sturm, Ruger & Co., Inc.
Newport, N.H.

Two-Way Street

In "Execs: Programmers Are Overpaid, Immature" [CW, March 15], Charlene Francl, assistant vice-president of Security Pacific National Bank, claimed that programmers are immature and "tend to act like children."

These amusing and highly irrational comments highlight the frustration felt by executives in dealing with high programmer turnover. Executives don't like to have their power contradicted by being held over a barrel by subordinates. As a programmer, I have found DP personnel to be highly mature.

Charlene Francl also said that programmers are not loyal to their companies. What many executives fail to realize is that loyalty is a two-way street.

There is no difference between a company firing people to cut costs and an employee changing companies to make more money.

Nick Scotto di Carlo
Bronx, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters may be edited for purposes of brevity and clarity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.

Not Just Good Practice

System Documentation: Provide It Early

By P. Howard Patrick
Special to CW‡

A software developer often clings to a secret hope that once a system is operational users will automatically know how to use it. Thus, documentation is often the last thing he thinks about.

Unfortunately, by the time the system becomes operational, it has some subtle idiosyncrasies and the operator who was trained in the system has left for another job.

Data processing documentation is no longer just good business practice. Regulations of the Securities and Exchange Commission require that at all times management be liable for ensuring adequate data processing procedures — and that "the controls are not out of control." Documentation provides evidence of a good-faith attempt to satisfy these requirements. It is one of the cheapest forms of insurance available.

It is essential that data processing documentation be provided as early as possible for the following reasons:

- For a system that is in the process of being developed, the documentation can be used as a yardstick in the development schedule.
- For a system that is supposedly developed, the documentation is not only necessary for in-house use, but also for auditors who have to certify the adequacy of controls.
- If you are dealing with a small vendor, insistence on documentation is critical.

In the ideal situation, documentation is cheap and up-to-date; in reality it is quite the opposite. Documentation is expensive because if it is to be done well it requires a person with programming knowledge, an ability to conceptualize and good written communication skills.

The documentor must have programming knowledge because often the programmer who wrote the program is unavailable or, if available, has forgotten how the program works. As a stop-gap measure it is often an industry practice for the programmer to write the documentation. In terms of controls, especially for financial systems, this is not desirable. Having the person who wrote the program also document it is akin to having the person who authorizes the issuance of checks also signing them.

The documentor cannot rely on comments in the program, because usually there aren't any. An even greater problem is when the code is subsequently updated but the comments are not. In the case of users' manuals, it is possible for a documentor with a knowledge of programming techniques to write manuals from just working at the terminal and seeing how the program works.

The initial design of a system is soon modified to accommodate new conditions. The design is quickly shrouded in a morass of patches, and the documentor has to be able to see beyond this patchwork for the initial design and possibly conceptualize a new design that incorporates the additional features.

Even when a person has good programming knowledge and an ability to conceptualize, if he cannot communicate in writing, he is of no use as a documentor. The bottom line is written communication skills. Not only must the person be able to describe the system in words (including flowcharts and diagrams), but he must also be able to organize the description.

Documentation is rarely up-to-date for two principal reasons: the documentation process itself and subsequent program changes. By its very nature, preparing documentation is a time-consuming process. An important factor in the time needed is the quality of the program that is to be described. If the original program is well written, it will take less time to document.

Programs change, especially in their development stages, as bugs are found and new conditions are allowed. One approach is to leave the documentation until a program has had time to settle down. Paradoxically, documentation is more critical in the formative stages so as to provide people a basis for determining the repercussions throughout a system of a simple change in one of the programs.

One of the not-so-obvious benefits of documentation (specifically program maintenance manuals in this case) is its use as a reference tool for training new programmers.

There also are legal implications regarding documentation. If the company becomes involved in a lawsuit where the reliability of the information supplied by the DP system becomes an issue, the existence of documentation will provide evidence of an attempt to ensure that adequate controls are in place. Furthermore, attorneys for both sides and the judge inevitably will have to become acquainted with the system. If there is no documentation available, it is not going to help management's credibility.

Patrick is an attorney and president of Computing Community Services Corp. in Bethesda, Md.

Fourth-Generation DBMS Unveiled

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — A data base management system (DBMS) designed to run on IBM and plug-compatible mainframes under VM/CMS and a VM/CMS version of Wylbur have been unveiled here by On-Line Business Systems, Inc.

VM/Spires is based on a network hierarchical model, the vendor explained. He described it as a fourth-generation system. It supports large production applications of up to five million records and 400 concurrent users, according to John Sack, director of the data base management group at Stanford University where the system has been in operation for several years.

VM/Wylbur is the VM/CMS version of Wylbur, On-Line Business System's product, which it describes as an alternative to IBM's TSO. VM/Wylbur currently is being used to support advanced research in physics at the Stanford Linear Accelerator Center, according to the vendor.

VM/Spires is said to be end-user-oriented. Its facilities include a data definition language, I/O formatting language capability, a report writer, a query language and a self-contained procedural facility designed to enable users to do repetitive tasks. It also has a host language interface that is intended for Cobol users.

"It has been in a production environment at Stanford for a large number of years and so is well tested," Sack said. "It does not require a data base administration function and this gives end users more flexibility."

On-Line Business Systems said it is pitting the product directly against University Computing Co.'s Focus, Mathematica, Inc.'s Ramis and National CSS's Nomad, as well as systems such as Cullinane Database Systems, Inc.'s IDMS and Intel Corp.'s System 2000.

Both VM/Spires and VM/Wylbur are priced at around $10,000, the vendor said. Full implementation and documentation of the products will take approximately nine months. However, the vendor currently is making them available on a nonsupported basis.

The vendor is located at 115 Sansome St., San Francisco, Calif. 94104.

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'Multi-Disc11M' Allows Multiple Disk Access

Utility Packages Out for DEC RSX-11M/S

WAYLAND, Mass. — EEC Systems, Inc. has announced several utility packages for Digital Equipment Corp.'s RSX-11M/S operating system, including Multi-Disc11M, a package designed to enable users to access several disk volumes located on possibly different drive types as a single disk using the Queue I/O interface.

The package can control up to 16 different multivolume disks of differing types of disk drives or disk-like devices, the vendor said. Once built, Multi-Disc11M requires approximately 26 disk blocks of disk space and 228 words of memory, together with 100 words of pool for its complete operation. The price for a single CPU license for Multi-Disc11M is $995 under RSX.

The vendor also announced Dache-11M, a memory disk package for DEC PDP-11 systems running under RSX-11M/S. This is intended to enable a section of the host computer system's main memory to be accessed as a "disk block cache."

A third package is Catch-23, software for the RSX-11M/S operating system that reportedly enables existing Direct Memory Access (DMA) device controllers, which have 18-bit DMS addressing capabilities, to be used with effective 22-bit addressing capabilities on the DEC LSI-11/23 Plus's Q22 Q-bus. A single CPU end-user license is available for $995.

EEC also noted the release of Accounts-11M, a resource accounting package for DEC PDP-11 systems running under RSX-11M. This package is intended to supplement the basic multiuser accounting supplied by DEC with RSX-11M. Accounts-11M carries a single CPU license fee of $1,595.

Wizdisc-11M is a package for the RSX-11M/S operating system designed to enable a section of the host computer's main memory to be accessed as a "disk device" using the normal system Queue I/O interface. A single CPU license fee for the package is $995.

The vendor is located at 286 Boston Post Road, Wayland, Mass. 01778.

Cobol Converter Ties DG to Prime

PITTSBURGH, Pa. — David R. Black & Associates, Inc. has released a Cobol conversion package designed to enable Cobol programs running on Data General Corp.'s Eclipse and CS-based systems to run on Prime Computer, Inc. systems.

The package is said to convert Cobol programs and data files, including DG Infos and screens sections, to Prime Cobol and Midas files.

According to the vendor, other features include:

- Conversion of DG Screen section including all special features such as blank, prompt, blinking and reverse.
- Conversion of Call Program to link various programs on Prime.
- Support for Dasher 200 terminals on Prime computers.

The package costs $7,500 — $15,000 if it includes Infos conversion — and is available from David R. Black & Associates, 20 Parkway View Drive, Pittsburgh, Pa. 15205.

'Rabbit-2' Update Gives Graphics

ATLANTA — Version 3.0 of Rabbit-2, a performance analysis software package designed to run on Digital Equipment Corp. VAX/VMS systems and PDP-11 RSTS/E systems, is available from Raxco, Inc.

Rabbit-2, an interactive software tool, is said to provide graphics representation of various system resources consumed by a single user, groups of users, projects, accounts, total system usage or program images. The package can also dynamically report who was on the system on specified dates and times. Version 3.0 provides new graphics capabilities by incorporating advanced video features of DEC VT100 terminals or look-alikes.

Other Version 3.0 features are said to include automatic scaling for vertical and horizontal bar graphics, reverse-image commands and bar selections. Rabbit-2 can now superimpose multiple graphics on the same display for comparison purposes. System data may be analyzed over any time period and any interval of time.

Rabbit-2 may be used by the system manager to investigate system bottlenecks, resource demand, user activities and program utilization and analysis, the vendor said. It may be used interactively through a series of English-like commands or via a batch file. Graphics output may be directed to the terminal or line printer.

Rabbit-2 costs $2,495 for PDP-11 RSTS/E and $3,995 for VAX/VMS systems. Rentals are $99/mo and $200/mo, respectively, from Raxco, Suite 200, 6520 Powers Ferry Road, Atlanta, Ga. 30339.

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DG's 'Iris' Enhanced; 'R8' Runs On Point 4, Nova-Type Systems

IRVINE, Calif. — A revised version of Data General Corp.'s Iris operating system (R8), running on the vendor's Point 4 and Nova-type systems, is now available.

The revised version has expanded file capacity, increased throughput, flexibility and improved software security, according to the vendor. Iris is a multitasking system, which can support time-sharing tasks in the foreground and batch processing tasks in the background.

Dynamic partitioning, improved dynamic buffer pool, a new time-sharing algorithm and support for interrupt driven disk drivers are among the innovations included on the revised Iris R8 to improve throughput and flexibility, the vendor said.

Keys can be up to 121 bytes long, the vendor said, adding that the number of keys in a directory is not limited by the length of the key. The system can utilize 128K bytes of random-access memory without mapping.

The revised system also includes a file feature — Polyfiles — that stores over 4 million records, the vendor said. Expansion is possible because index files are no longer limited to one logical unit in length, but are distributed in multiple volumes on multiple logic units.

Iris R8 has an improved security device called Pico-N, which is designed to prevent unauthorized use of proprietary packages, the vendor said.

Iris R8 costs $3,600 and is available from the vendor at 2569 McCabe Way, Irvine, Calif. 92714.

Interface Links 'SAS' to TSO

HARTFORD, Conn. — Northeast Utilities here is offering an interface to IBM's TSO and Structured Programming Facility from SAS Institute, Inc.'s Statistical Analysis System (SAS).

The SPF/SAS Clist interface consists of two panels, the SAS Clist interface and the Output Processor. The first panel handles the calls to SAS and the second handles the I/O and rerun capabilities, the vendor explained.

The package includes a main Clist driver, a Clist interface panel, an output processor panel, interface messages, output processor messages, installation instructions and documentation, the vendor said. It is modular in format to allow for customization.

The SPF/SAS package is priced at $75, including postage and magnetic-tape costs, according to the vendor. For an additional $25, the vendor will include PL/I and Cobol compiler interfaces and a linkage editor interface.

The vendor can be contacted c/o Cary Prague, Berline N-201, P.O. Box 270, Hartford, Conn. 06101.

IMS DB/DC Tied To Data Designer

ANN ARBOR, Mich. — Data Base Design, Inc. has announced an interface to link its Data Designer package with IBM's IMS data base/data communications (DB/DC) data dictionary.

Data Designer is an automated software tool for producing a third normal form logical data model by consolidating user views. Until now, the package used only internal files. With the IBM interface, the package can perform I/O operations using the DB/DC data dictionary, the vendor said.

The interface costs $7,500, and the Data Designer package costs $30,900, the vendor said from 2020 Hogback Road, Ann Arbor, Mich. 48104.

Cobol Generator Out for OS, DOS

LISLE, Ill. — Technics, Inc. has introduced a parameter-driven Cobol generator that reportedly allows structured programming control forms to be used as real code and be combined with standard Cobol statements to build working programs.

Cobol/II is available in OS and DOS versions for IBM-370-compatible machines.

Procedure Division code is processed just before the compilation step to translate pseudocode and macros to executable Cobol. Programmers write and maintain high-level code, not translation code. Existing programs on Pansophic Systems, Inc.'s Panvalet or Applied Data Research, Inc.'s Librarian files reportedly can be upgraded in several maintenance runs into top-down designs and readable formats.

Short codes for data and prerequisite routines to generate Cobol clauses eliminate the writing of the first three divisions of a program, according to the vendor. Keystrokes are cut in half, according to the vendor, and the code is expanded to Cobol source code and saved on a source program library where it can be maintained with standard procedures.

The software system can be licensed for $7,500, which includes one year of maintenance, the vendor said from 4715 Old Oaks Drive, Lisle, Ill. 60532.

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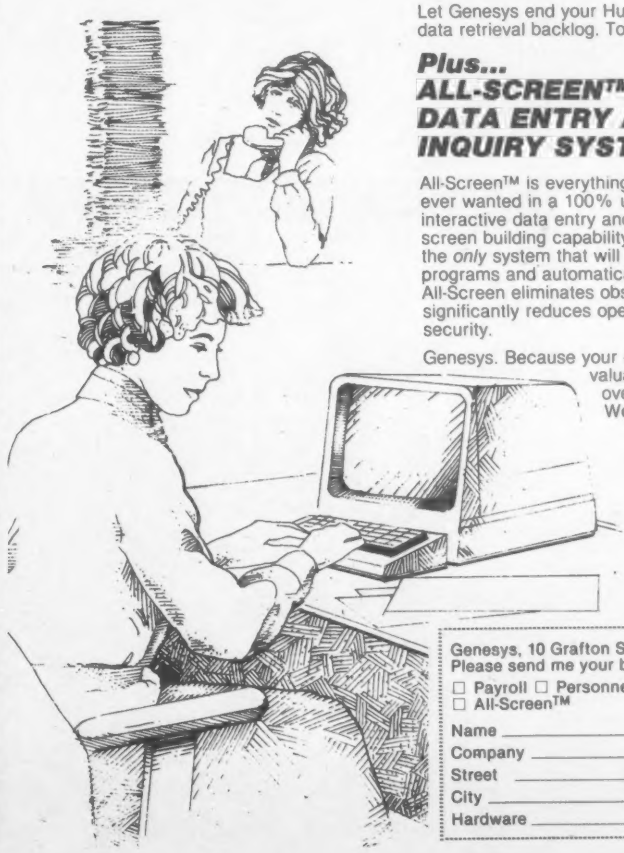

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Geisco Enhances DDP T/S Service

ROCKVILLE, Md. — General Electric Information Services Co. (Geisco) has added hardware and software capabilities to its distributed data processing (DDP) time-sharing service.

The capabilities include word processing, a Texas Instruments, Inc. DX10 operating system, a TI Model 990/12 central processor and additional software to complement its data base manager. These features were designed to supplement Geisco's Marklink terminal, a minicomputer system used especially for remote processing activities.

Users can also combine WP and/or DP with Geisco's Quik-Comm system, used for electronic message delivery, the vendor said. The word processor software license fees are $50/copy/mo.

In addition to the TI DX10 operating system, which can be used on Geisco's Marklink terminal, other TI software available to Geisco DDP service users includes DX10 Fortran 78, DX10 Cobol, 3780/2780 Emulator Communications, DX10 Sort/Merge, Tiform, DBMS 990 and Query 990. The DX10 operating system costs $85/copy/mo under a one-year license agreement. The other modules are similarly available at $150/copy/mo each.

The TI Model 990/12 costs $1,523/mo under a two-year lease, with a $533 maintenance charge. Purchase price is $48,350.

The data base manager's software enhancements include a utility that processes updating information and adds and deletes records. Geisco is located at 401 N. Washington St., Rockville, Md. 20850.

Electronic Data Updates 'SAC,' Adds Report Consolidation to 'Splitter'

DALLAS — Electronic Data Systems Corp. has added report consolidation to its Splitter package, which now runs under IBM's MVS operating system with JES2. The firm also has updated its Security Access Controller (SAC) package with password control and program pathing.

SAC, which runs on IBM and compatible equipment under VS, VS1 and DOS/VSE, is said to provide system entry protection by identifying users, mode of entry, level of access and authorization at the time of entry to a system. Program pathing allows security administrators to protect restricted data sets by limited access through specific programs, the vendor said.

Splitter runs on IBM and compatible equipment under MVS, VS1, SVS and MVT operating systems, according to the vendor. The package can remove selected output data sets from JES2 queues to produce a compressed archive file that can be printed in total.

SAC is priced at $10,000 for the DOS/VSE, $15,000 for the VS1 and $20,000 for the MVS, while Splitter is priced at $5,000. They are available on 30-day free trials from Electronic Data Systems, 7171 Forest Lane, Dallas, Texas 75230.

Tool Converts Qantel Packages

SAN JOSE, Calif. — The Liberator I, an operating system that reportedly allows for use of Qantel Corp. applications software on Honeywell, Inc. DPS-6 systems, has been introduced by Western Business Computers, Inc. (WBC).

The Liberator I works like a compiler, according to the vendor, allowing users with Honeywell hardware to avoid the cost of software conversion. The Liberator I is being marketed only with the Honeywell DPS-6.

Cost of the system with Liberator I ranges from approximately $30,000 to $300,000, according to a company spokesman.

WBC is located at Suite 272, 2025 Gateway Place, San Jose, Calif. 95110.

Loan System Fits IBM, Burroughs

ORLANDO, Fla. — An Installment Loan Extended (ILX) System to run on IBM and plug-compatible mainframes running under DOS and OS systems and Burrough Corp.'s Medium System is available in on-line or batch versions from Florida Software Services, Inc.

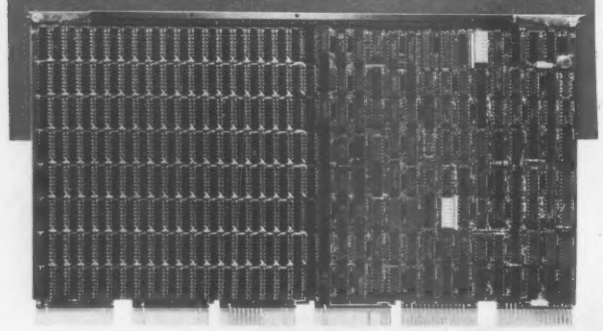
The ILX system is said to include three major features: variable rate consumer loans, general ledger interface and a selected reports generator.

Additional features are said to include multibranch/multibank processing, simple interest, student loan processing, dealer reserve accounting and comprehensive management reporting.

The ILX costs $25,000.

The ILX system is available from Florida Software Services, which is located at Kirchman Building, 711 E. Altamonte Drive, Altamonte Springs, Fla. 32701.

DEC-COMPATIBLE SEMI ADD-INS



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PDP-11	DR-214SP	hex	1.0 MB
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PDP-11	DR-244S	hex	4.0 MB
VAX®-11/750 PDP-11/70	DR-175S	hex	256 KB
VAX-11/780	DR-178S	extended hex	512 KB
DECSYSTEM 2020®	DR-120S	extended hex	512 KB
PDP-8/A	DR-118S	quint	128 K x 12

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Business Graphics, DASD for IBM MVS Offered

PHOENIX — Capex Corp. has announced the availability of two software products: a full-color business graphics system for nonprogrammers and managers and a direct-access storage device for use on IBM MVS-based computer systems.

The Flexigraf graphics system reportedly allows users to create charts or graphs, company logos, organizational charts and graphics designs. The system will also handle text, legends and borders, according to the vendor.

Features of the system include automatic data access, conditional statements, arithmetic capabilities and unlimited color and scaling specifications.

The system is fully integrated with Autotab II, a financial planning system also available from the firm, and compatible with a variety of hardware devices including those offered by Tektronix, Inc., Ramtek Corp., IBM and Hewlett-Packard Co.

Manage:Dasd is a direct-access storage device package that is said to automate those functions necessary to control and protect disk data sets, including backup, archive, restore and controlled scratch. The software is said to increase usable disk space by eliminating and/or moving unused or obsolete data sets, protect Dasd data sets and support disaster recovery plans.

The package interfaces with Capex's tape library management system on a real-time dynamic basis, the vendor said.

Flexigraf is available as a stand-alone package or as a compliment to Autotab II. Cost of a permanent license for Flexigraf is $26,000. When purchased as an Autotab II option, the package costs $18,000. The permanent license cost for Manage:Dasd is $7,500.

Additional information is available from Capex, located at 4125 N. 14th St., Phoenix, Ariz. 85014.

Supply Aid Announced

PALO ALTO, Calif. — An inventory management software package for wholesalers and distributors of food, drugs and general merchandise has been developed by Systems Control Technology, Inc.

Computer Recommended Investment Buying reportedly customizes investment recommendations to meet each wholesaler's management policies, carrying costs and inventory goals.

In-house training and on-call consultation services are offered with the software, which is available for IBM, Digital Equipment Corp. and Honeywell, Inc. mainframe computers.

The minimum configuration for a user controlling one distribution center and running one CPU would typically cost $20,000 for the sign-on fee and $12,000 for an annual fee. The firm is located at 1801 Page Mill Road, P.O. Box 10180, Palo Alto, Calif. 94303.

Graphics Tool Supports 4110s

BEAVERTON, Ore. — A graphics package said to support Tektronix, Inc.'s recently introduced 4110 Series Intelligent Computer Display Terminals is now available.

Local Easy Graphing (LEG) runs under the 4110 Series products without host connection to generate line, bar and pie charts for presentations and reports, according to the vendor. The package is compatible with Tektronix's Plot 10 Easy Graphic, allowing previously written programs to be downloaded and run in the local terminal environment.

Other LEG features are said to include English-language command structure, on-line help files and the ability to produce special symbols, legends, titles, grids, dynamic placement movement of annotation, calendar axes and log axes.

LEG is priced at $1,700 and is available from Tektronix's Marketing Communications Department, at Mailing Station 63-635, Tektronix, P.O. Box 500, Beaverton, Ore., 97077.

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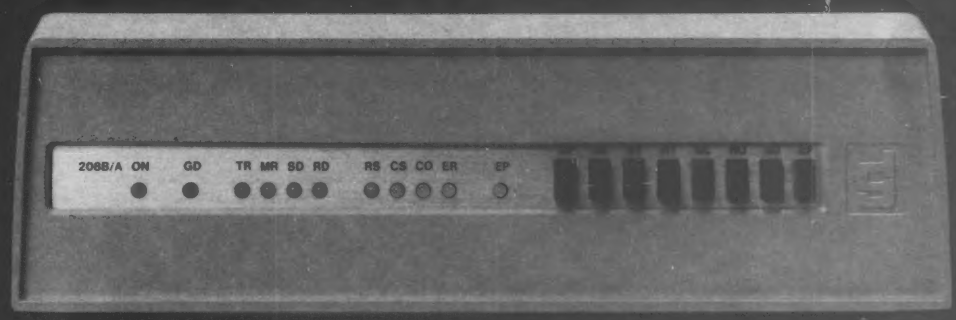

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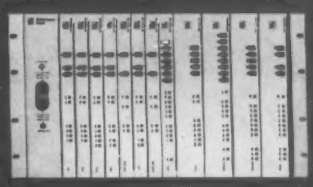

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Fits IBM, Prime, DEC

Package Aids in Planning Limited Resources

TORONTO, Ont. — A decision support package designed to aid in the planning and scheduling of limited resources over time has been developed by Numetrix Decision Sciences Ltd.

The Resource Utilization and Logistics Tool (Result) runs on IBM 370 and up and IBM-compatible machines in TSO and CMS environments, as well as Prime Computer, Inc. and Digital Equipment Corp. equipment, or "any environment that supports 3270 terminals," a company spokesman said.

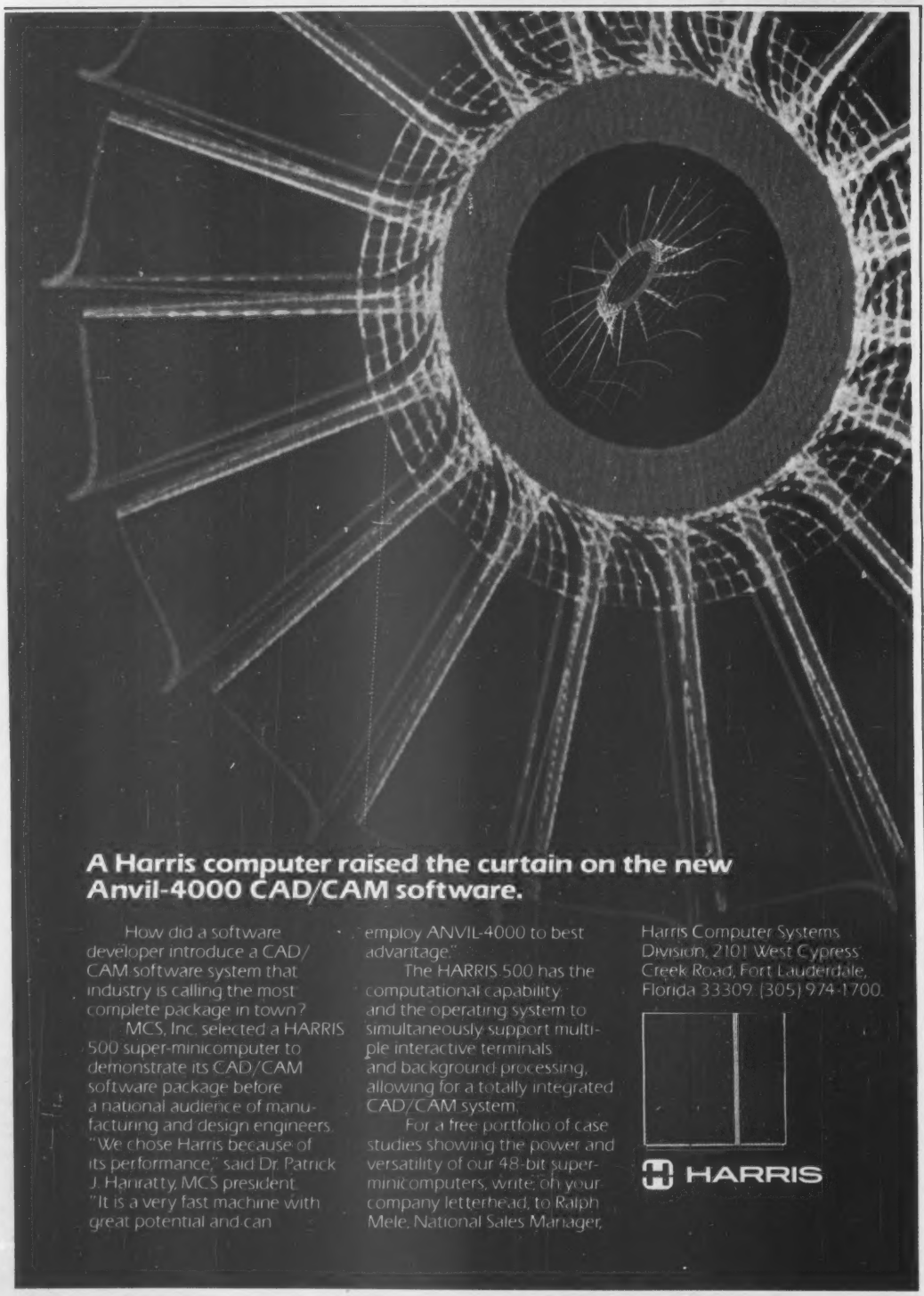
The software is said to have built-in optimization techniques the scheduler can apply to a problem without understanding the inner workings of the programs or the mathematical theory.

Result features a data base manager for case studies and alternate scenarios, interactive retrieval and update of all data in the data base and data- or table-driven modeling, according to the company spokesman. Also included are on-line modeling capabilities and a built-in simulator for cost evaluation and inventory projections, the spokesman added.

A one-time license fee costs $80,000.

The software can also be leased for $800/mo per application at a maximum cost of $3,000/mo and is available on the Numetrix time-sharing service on an as-used basis, without surcharge or minimum monthly fee, the company spokesman said.

Numetrix is located at 3 Church St., Toronto, Ont. Canada M5E 1M2.



'SMM/Tracs' Out for OS

SACRAMENTO, Calif. — Software Module Marketing, Inc. has introduced an OS version of its Teleprocessing Remote Access Control System (SMM/Tracs) for IBM large-mainframe and plug-compatible installations.

SMM/Tracs had previously been released for the IBM DOS.

SMM/Tracs can provide distributed data processing capabilities, the vendor said, without a large investment of programming time. It supports bisynchronous batch data transfer between the host CPU and different types of remote devices, including minicomputers, the vendor said.

The OS version costs $6,950 for the first CPU, and the DOS version costs $4,950 for the first CPU from Software Module Marketing, 1007 Seventh St., Sacramento, Calif. 95814.

Cobol Aid Announced

NEWTON CENTRE, Mass. — A utility package said to improve Cobol program maintenance has been developed by Arkay Computer, Inc.

Excheck reportedly prints the Cobol program in a way that helps the programmer analyze a program's functions. Cross reference is shown on the same line as the Cobol statement.

In the Data Division, every use of a data item is printed to the right of the data name and the type of Procedure Division statement is visible in the Data Division, a spokesman explained.

Excheck is available on IBM OS, MVS and DOS and Wang Laboratories, Inc. VS systems. A free 30-day trial is available. Permanent license fees range from $2,900 to $4,900 from the firm at 24 Manor House Road, Newton Centre, Mass. 02159.

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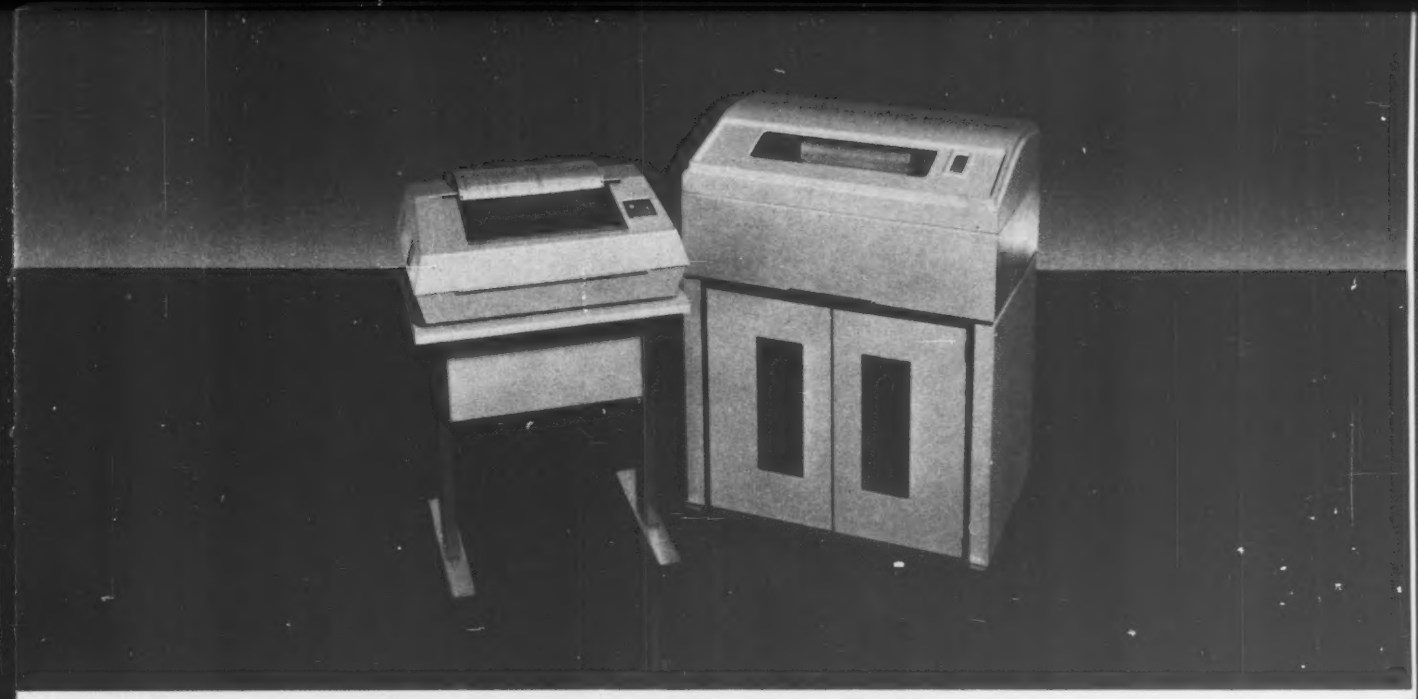

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Enhanced 'Wylbur' Supports IBM MVS/SP3, Disk Drives

SAN FRANCISCO — On-Line Business Systems, Inc. has added support for IBM's MVS/SP3 operating system and IBM 3375 and 3380 disk drives to its Wylbur software package, which is described by the vendor as an alternative to IBM's TSO. The vendor also unveiled an interactive, on-line tutorial for Wylbur called Learn.

Version 6.0 of Wylbur's compatibility with IBM's MVS/SP3 reportedly is made possible via a new SP3/JES2 interface developed by On-Line Business Systems.

The Wylbur disk drive enhancement involves a new data management service request tailored for the IBM 3375 and 3380, which replaces a service-request format used with earlier model IBM disk drives, the vendor explained.

The Learn tutorial reportedly features beginning, intermediate and advanced modules for users to study at their own pace and is for use with the latest (6.0) release of Wylbur only. It reportedly supplements the Wylbur user manuals and the customer classes scheduled for this summer. Learn is available immediately and costs $5,750. It is supplied on a temporary free-trial basis to all users purchasing Wylbur.

The upgrades are available with Wylbur 6.0 at no cost to current users, who will receive them with their next scheduled maintenance release, the vendor said from 115 Sansome St., San Francisco, Calif. 94104.

Conversion Tool Fits DG Nova

KENNER, La. — A conversion package for use on Data General Corp.'s Nova and compatible systems is available from Executive Automated Systems, Inc. (Easi).

The Micos package allows DG's Micos operating system users to convert both programs and data files to Dynamic Concepts, Inc.'s Basic Interactive Timesharing System (Bits), the vendor said. Bits was designed to be hardware independent and currently runs on Nova-compatible systems, including systems from Eclipse System, Ampex Corp., Bytronix Corp., Digidyne, Inc., Fairchild Camera and Instrument Co., Randal Data Systems, Inc. and SCI Systems, Inc, according to a company spokesman.

The Micos package is menu driven and designed so that end users can convert systems without extensive knowledge of operating systems or application software, the vendor said.

End-user price for the Micos Conversion Package is $2,500. The package is available from Easi, Suite 106, 1919 Veterans Memorial Blvd., Kenner, La. 70062.

Evaluation Package Targets Chain Stores

CHAPEL HILL, N.C. — A performance-evaluation software package designed for chain store management to run on IBM OS/VS systems is available from Performance Analysis Corp. (PAC).

Store Performance Evaluator allows management executives within a chain to compare performance in terms of revenues, contributions to profit, market shares, number of employees, square feet of selling space and selling-area demographics, according to the vendor.

Users can buy the package for in-house use at a price of $150,000 plus a 5% annual service renewal fee, or they can hire PAC on a consultant basis. PAC charges a $100/store to $150/store fee for this on-site consultation, with discounts available to large chains. PAC is located at Suite 101, 400 Eastowne Drive, Chapel Hill, N.C. 27514.

Fortex 'Carms' Upgrade Provides Cash-Processing Enhancement

DALLAS — Enhanced cash processing and credit and collection tools are among the features included in University Computing Co.'s Release 4.0 of its Fortex Credit and Accounts Receivable Management System (Carms) intended for users of IBM and plug-compatible computer systems.

With the automatic cash-processing enhancement, the system reportedly applies payments to customers without any clerical input.

It can also accept invoice detail from bank lockboxes, identify it to the customer and apply it to an open item, a spokesman for the company said.

The collection tools reportedly provide automated customer follow-up as well as displays of user-defined exceptions. On-line access to payment history is also available, according to University Computing.

The enhanced reporting capabilities are said to provide management with the status and trends of credit, receivables and collections through comparative reports.

Release 4.0 software is $95,000 for the on-line system, and the batch system is available for $65,000 from University Computing, UCC Tower, Exchange Park, Dallas, Texas 75235.

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VAX Users Get Enhanced DBMS

KINGSTON, N.J. — An enhanced version of its DRS data base management system for users of Digital Equipment Corp.'s VAX is available for purchase or on a time-sharing basis from Data Structures, Inc.

DRS, Version 3.0, has integrated query and update languages supporting all data structures and a wide range of access methods, according to the vendor.

Full Report Writer (RPW II) capability, including automatic multilevel totals and counts, is included, according to a spokesman. RPW reportedly allows printer style graphics, and DRS Plot options provide an interface to graphics terminals.

Audit trailing and recovery, full video-display-terminal control for forms-oriented data entry and retrieval and support for mixed terminal types are also included, the vendor said.

Choices of Language

DRS users can also program their choices of language, including Fortran, Cobol and Pascal.

Time-sharing costs for Version 3.0 vary between $12/hour and $30/hour, depending on usage. The base price to purchase the system is $39,000, according to the vendor spokesman.

Data Structures, Inc. is located at 122 E. 42nd St., New York, N.Y. 10017.

Report Generator Subsystem Introduced for Dialog's 'Plato'

NEW YORK — Dialog, Inc. has introduced a report generator subsystem for its Plato Decision Support System software.

The Plato report generator will run on most mainframes and minicomputers, the vendor said, including most IBM machines and the Prime Computer, Inc. Series 50.

The report generator permits users to develop customized reporting formats for specialized applications. Standard features include full-formatting control, user labeling, group handling, multilevel subtotals and totals, file output, pagination, titles and subtitles, the vendor reported.

The Plato Decision Support System also includes statistical and forecasting routines, a data base system, a programming capability and a three-dimensional interactive color graphics system for business presentation of data.

The package costs between $20,000 and $60,000 to buy and between $1,000/mo and $3,000/mo to rent from Dialog, 35th Floor, 19 Rector St., New York, N.Y. 10006.

Graphics Out For Wang's VS

HINGHAM, Mass. — A data integrated multicolor business graphics package for users of Wang Laboratories, Inc.'s VS system has been unveiled here.

Impact, from Engineering Design Concepts, Inc., allows users to convert columns of numbers into color charts, graphs, maps, slides and transparencies. It is a menu-driven, interactive system that ties directly into the computer data files on the Wang system. Its multiuser capabilities enable any user tied into the system to make use of the graphics, regardless of location, the vendor said.

The software is currently available for VS systems and is priced at $9,950, the vendor said from 160 Old Derby St., Hingham, Mass. 02043.

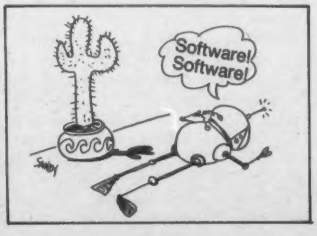
Office Manager Out for Doctors

SALT LAKE CITY, Utah — A medical-office management system that runs on Microdata Corp.'s Reality minicomputers and Applied Digital Data Systems, Inc.'s Mentor computers has been announced here.

Medifacs, from Medicomp, Inc., has been designed to allow doctors or office personnel access to patient information and to streamline medical billing procedures. It also provides appointment scheduling, automated insurance-form processing, word processing, medical records analysis, hospital reports and on-line patient account accessibility, the vendor said. Options include general ledger, accounts payable and payroll system software.

This software is available on a turnkey basis, which includes a CPU with 128K bytes of main memory, eight terminal ports, one terminal and one matrix printer and all the Medifacs software; it costs $45,000. This configuration can reportedly handle up to eight doctors and over 40,000 patients and can be expanded.

Medifacs is also available on a time-share basis at $350/mo, the vendor said from Suite 224, 140 W. 2100 St., Salt Lake City, Utah 84115.



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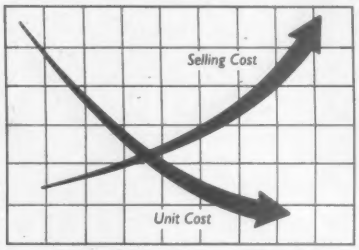

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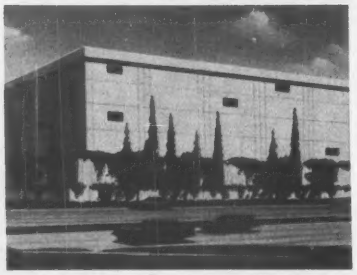

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Micronotes

Visicorp, formerly Personal Software, Inc., has announced a new version of its **Visicalc** electronic spread-sheet program said to make use of 214K bytes of the maximum allowable 256K-byte memory extension recently announced by IBM for its Personal Computer. Version 1.1 costs $250 from the firm at 2895 Zanker Road, San Jose, Calif. 95134.

Ferox Microsystems, Inc. has developed a desktop computer communications package said to convert the IBM Personal Computer, Apple Computer, Inc.'s Apple II and Apple III or Radio Shack's TRS-80 Model II into autodial, autoanswer intelligent terminals. **Logon** costs $150 from Ferox, Suite 611, 1701 N. Fort Myer Drive, Arlington, Va. 22209.

Dynabyte Business Computers, Inc. offers Condor Computer Corp. Series 20 data base management for its Series 5000 business computers. The base system is the Condor 20-1, with file management, inquiry and report writing capability, for $295 from Dynabyte at 521 Cottonwood Drive, Milpitas, Calif. 95035.

Phase One Systems, Inc. has announced a **Ctran option** for its multiuser Oasis operating system that reportedly will translate Compiler Systems, Inc.'s C Basic source programs into Oasis Basic. Ctran costs $250; a user manual costs $25.

Also from Phase One is the **Masterplan Financial Modeling package** designed as an optional utility for the Oasis operating system. Said to combine the power of a time-sharing-oriented modeling package with the convenience and versatility of a business microcomputer, the software costs $495, with a manual priced at $35, from the firm at Suite 830, 7700 Edgewater Drive, Oakland, Calif. 94621.

Digital Research, Inc. has announced the **Concurrent CP/M-86**, an operating system for Intel Corp. 8086- or 8088-based microprocessors for simultaneous performance of jobs by a single user. Programs running under Concurrent CP/M-86 can address up to 1M byte of memory. The Concurrent CP/M-86 offers file-structure compatibility with all Digital Research operating systems including CP/M-86 and MP/M-86. The system is priced at $350. Orders can be placed beginning in mid-June with Digitial Research, P.O. Box 579, Pacific Grove, Calif. 93950.

Sentinel Computer Corp. has announced the implementation of an Ansi 74 low-intermediate version of Cobol on its Intel Corp. 8086 microprocessor-based Data Base Operating System. The Cobol compiler costs $2,500 from the firm at 9902 Carver Road, Cincinnati, Ohio 45242.

A multiwindow, full-screen **text editor** option to run on Zilog, Inc.'s MCZ-1 microcomputer, PDS 8000 and ZDS-1 microprocessor development systems is now available for $250 from Zilog, 10340 Bubb Road, Cupertino, Calif. 95014.

NEC Information Systems, Inc. has released a **communications board** with two standard RS-232C ports and options to run on either Data Terminal Systems, Inc. or Data Communications Corp. equipment. The firm also released three synchronous communications packages to emulate an IBM transaction and transfer facilities and an IBM multileaving workstation. The communications board price is $250. The software packages have a master license fee of $995 each and are available from NEC, 5 Militia Drive, Lexington, Mass. 02173.

A financial modeling application software package, **Supercalc**, to run on General Binding Corp. Systems 9 and 12, is available for $295 from General Binding, One GBC Plaza, Northbrook, Ill. 60062.

The **Basic/Z**, a native code compiler for most Digital Research, Inc. CP/M-based systems, is available from System/Z, Inc., P.O Box 11, Richton Park, Ill. 60471. Single site package price is $345; documentation is $35.

"**Q**," a query package and report writer, is available from Logical Software, Inc. for use with its Logix relational data base management system, running on Bell Laboratories Inc. Unix-based microcomputer systems. The "Q" feature is available only with the Logix data base. The price for Logix is between $5,000 and $15,000, depending on the size of the system. Logical Software is located at 55 Wheeler St., Cambridge, Mass. 02138.

A Digital Research, Inc. CP/M- and MP/M-based disk file librarian that allows users to store many disk files into a single larger file has been introduced by Advanced Micro Techniques. **Microlib** maintains a 50-char. description with each file saved in the library, provides reports that describe the contents of a library and offers two levels of security for files placed in the library. It sells for $295, according to the vendor at Suite 209, 1291 E. Hillsdale Blvd., Foster City, Calif. 94404.

A graphics software program called **Strobe 100** has been announced for users of Visicorp's Visicalc data files and Apple Computer, Inc. microcomputers. Data stored in a data interchange format file can be plotted on 8½-in. by 11-in. paper using the Strobe plotter. Strobe 100 is base priced at $785 and is available from Strobe, Inc., Building 5A, 897 Independence Ave., Mountain View, Calif. 94043.

Microtec has released two interactive simulators, one for Intel Corp.'s 8051 microprocessor and one for Motorola, Inc.'s 68000 microprocessor. These programs are written in Ansi standard Fortran IV and perform interpretive execution of the microprocessor object module in an interactive or batch mode. The **8051 Simulator** and **68000 Simulator** can simulate up to the full size of the microprocessor memory, random-access/read-only memory environment, I/O operations and interrupts. The price of the 8051 Simulator is $1,250, and the 68000 Simluator costs $1,400. The vendor can be reached through P.O. Box 60337, Sunnyvale, Calif. 94088.

For IBM Personal Computer users, Santa Clara Systems, Inc. has unveiled CP/M-86 with its two new hard-disk products. The first of the storage products, the **SCS-Minimega** is a 5¼-in. disk subsystem that comes in both 5M- and 10M-byte configurations with an optional 1M-byte 5¼-in. floppy for backup. The **SCS-Sabrina series** is a removable Winchester product, featuring 10M bytes of storage on an 8-in. removable cartridge, along with a fixed disk capacity from 10M- to 40M bytes. The Minimega ranges from $3,495 to $4,756, depending upon disk capacity. The Sabrina series range is $7,310 to $10,156, according to the vendor at 560 Division St., Campbell, Calif. 95008.

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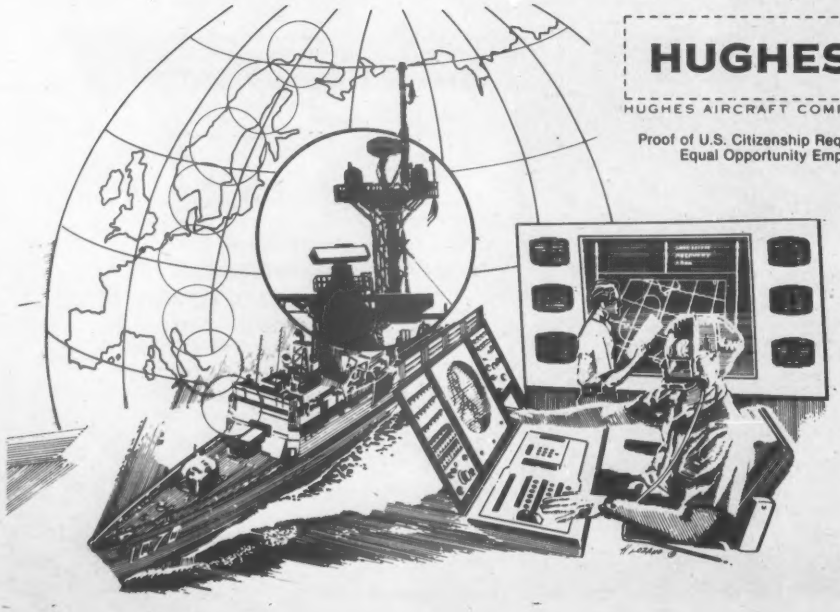

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For On-Line Information Services

Enhanced Telephone: 'Terminal for '80s'

By Phil Hirsch
CW Washington Bureau

DALLAS — The most popular terminal of the '80s for users of on-line business information services will be an enhanced telephone, Dale Kutnick said here. Kutnick, market research director of The Yankee Group, a Cambridge, Mass.-based consulting firm, chaired a session entitled "Super Information Services Take Shape" at Interface '82 here recently.

A number of companies, including Northern Telecom, Inc.; GTE Telenet Communications Corp.; and Tymnet, Inc., are now offering or testing enhanced telephone terminals with keyboards and CRTs that provide data input and output, Kutnick reported.

Key attributes for commercially successful business information terminals in the '80s will include low price, user friendliness and the capability to provide near-universal access, according to Kutnick. The goal, he said, is a terminal that allows the user to access any data base through use of a standard session establishment procedure, that also allows the user to retrieve and manipulate the information stored within the data base.

Efforts to develop such a capability are well under way. Kutnick cited Datapoint Corp.'s AIM and IBM's SQL as examples of the user-friendly data base management systems of the future.

Dennis White, marketing vice-president of Tymnet, added that Tymshare has developed a common query routine through which travel agents can access several airline reservation data bases. He indicated that the company is developing similar routines for other applications.

Another important trend of the '80s in information network technology will be the growth of value-added networks providing network-resident terminal support. Tymshare's Tymnet and United Computing Systems, Inc.'s Uninet are already providing this support. AT&T is planning to do likewise with its Advanced Communications Systems and, according to Kutnick, there will be at least two more such networks announced this year by GTE Information Services Co. and ADP, Inc., a nationwide on-line service bureau organization.

One system that might be left behind by this trend toward greater sophistication and diversification is videotex, said Richard Veith, the final speaker at the session. Veith is the video systems product manager for Logica, Inc., the U.S. subsidiary of a major British videotex systems developer.

"There seems to be a rather wide gap between what videotex was initially intended for and what it is being used for now; videotex systems initially were intended for the mass market, but the majority of customers are in the business community. The dilemma is that simple interaction, limited processing power and color graphics — important for attracting the mass market — are not too important for winning the business market. There, quality and timeliness of data, as well as the capability for complex processing of the data, are keys to success," Veith said.

He predicted that videotex developers will overcome this problem by creating systems designed especially for business users. The systems will tend to become differentiated from home videotex systems and more like other on-line business information systems, he said.

"Many business people do not use computer systems because there has been no low-cost, easy way to migrate from current procedures to computerized ones that would enhance current operations," Veith said.

If videotex can offer that capability, there is "reason to attach a great deal of importance" to its future as an on-line business information system, he added.

Two Terminals Out For IBM 8100 Series

PORT CHESTER, N.Y. — IBM has introduced two versions of a CRT terminal designed for its 8100 Series Information System.

The Model 3104's features are said to be comparable to the current 8100 Series Model 8775, but at a cost of about 40% less. Such features include a 12-in. screen that can display up to 1,920 char. of data in 80 columns and 24 rows.

The terminal is said to be suited for industries such as insurance, manufacturing and transportation, which need economical display capabilities for their distributed locations.

The unit reportedly is compact and modular, with a display screen, small logic unit that serves as a base for the screen and a separate keyboard. The display screen can be tilted or swiveled to provide more comfortable viewing, a company spokesman said.

The Model B1, with a 75-key data entry keyboard, including 10 program function keys, costs $2,190. The Model B2, with 87 keyboard keys and 24 program function keys, costs $2,250. Volume discounts are available. Deliveries will begin in May from 900 King St., Port Chester, N.Y. 10573.

Consultants: DTS Future Limited

By Phil Hirsch
CW Washington Bureau

DALLAS — Although Satellite Business Systems (SBS), MCI Telecommunications Corp., Tymnet, Inc. and GTE Telenet, Inc., among others, have decided to build digital termination systems (DTS) in major cities throughout the nation, the service has only a limited short-term future.

That was the contention of two Yankee Group consultants at Interface '82, which was held here recently.

One problem is that the Federal Communications Commission (FCC) has not allocated DTS enough bandwidth to accommodate all of the applicants, according to Donald A. Gooding. This probably means that lengthy hearings will be required at the commission before at least some of the channels are assigned.

Another problem, he added, is that each DTS channel can carry a maximum of 1,544M bit/sec, which makes the service unsuitable for digital voice and for some other applications such as video teleconferencing and computer-to-computer bulk data transfers.

Both problems may be reduced or eliminated if the FCC decides to open the 18 GHz band to DTS, Gooding noted. The present allocation is in the 10 GHz band.

Gooding's associate, Dale Kutnick, contended that optical fiber cable is a much

(Continued on Page 62)

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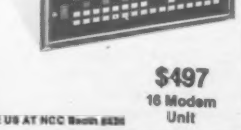

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Port-Saver Gains Converter

ST. LOUIS — Integrated Design Engineering, Inc. (IDE) has added its NCR Corp. 275/270-200-compatible protocol converter to its Port-Saver series of microprocessor-controlled data communications devices for use on NCR and other central host systems.

The 270 series is said to provide communications capabilities between the host-polled network and up to four various dumb peripheral devices via RS-232 channels.

The 270 series may be connected to the host system directly using modems found at most installations or by using an IDE Series 100 Modem Sharing Unit that provides increased network efficiency. Since the 270 series communicates like an NCR 270-type unit, it may be mixed on the same network line as other NCR devices, the vendor said.

Standard capabilities provide unit self-test and a number of switch-selectable options including individual bit/sec rate selection up to 19.2K bit/sec between ports.

Price is $1,500 each with quantity discounts available from IDE, P.O. Box 16307, St. Louis, Mo. 63125.

Dim Future Seen for DTS

(Continued from Page 61)

more desirable transmission medium than the microwave channels utilized by DTS. Lightwave transmission provides greater bandwidth and is not degraded by bad weather or electromagnetic interface — both of which affect microwave — and does not pose a radiation hazard, Kutnick said.

While optical fiber is relatively expensive and does not lend itself to multi-dropped circuits, Kutnick expects these difficulties to be largely eliminated by technological advances during the next few years.

Cable TV networks represent another likely alternative to DTS, Kutnick said. The Yankee Group believes that within a few years, local CATV networks will lease intercity satellite/terrestrial channels and metamorphose into "cable supercarriers" offering wideband digital data services, end-to-end, on a nationwide basis.

As a result of these trends, the Yankee Group official explained, DTS carriers will not significantly penetrate the local exchange market until about 1985. By that time, he expects that "one or two" DTS carriers will be in business, each servicing about 20 cities.

The ultimate size of the DTS market will be between $6 million and $50 million in annual revenue , he said, depending on such developments as how quickly cable TV companies begin offering wideband data communications services and whether the FCC opens up the 18 GHz band to the new service.

By about 1990, Kutnick expects optical-fiber local-distribution networks to begin obsolescing DTS.

For Personal Computers, Viewdata

Asynchronous Modem Series Out

NEW YORK — ITT Data Equipment and Systems Division has introduced a modem series for asynchronous transmission applications including personal computer and viewdata requirements.

The 1180 modem series is reportedly available in send or receive configurations and functions at up to 300 bit/sec full-duplex on switched telephone networks.

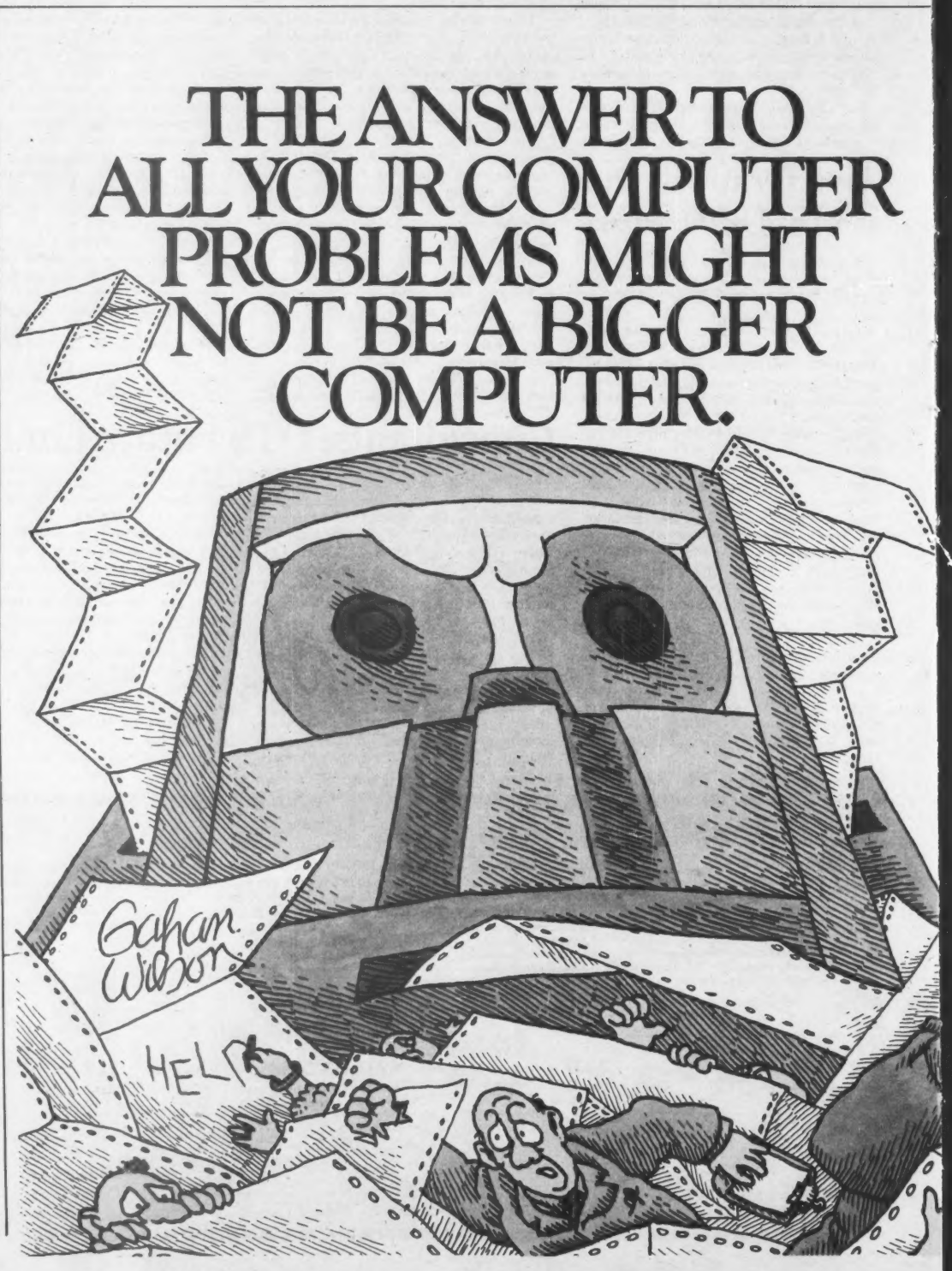
The originate unit is the 11809 A and the answer unit is the 1180 B.

Transmission Speeds

For transmission at 75 bit/sec and reception at 1,200 bit/sec, the 1182 A modem is available for use in full-duplex split-speed operation on switched telephone facilities. The 1182 B provides transmission at 1,200 bit/sec and reception at 75 bit/sec, the vendor said.

The data terminal interface characteristics of the 1180 family meet RS-232 and CCITT V.24/V.28 recommendations.

Each modem ranges from $350 to $400 and is available from ITT, Suite 8927, One World Trade Center, New York, N.Y. 10048.



Packet Switcher Creates Private Nets

ATLANTA — A packet switcher that reportedly allows users to create their own private X.25 packet-switching networks, which can transparently interface to public packet-switched networks, is available from Memotec Service Corp., a division of Systcoms, Inc.

The Memotec Mpac 2500 Mini Node reportedly allows users to link their networks with Telenet, Tymnet, Datapac, Datex-P, Datanet 1 and other public packet-switched networks.

The device handles up to eight X.25 communications channels at standard line speeds of 1,200 bit/sec to 9,600 bit/sec at an aggregate input/output of 56K bit/sec. The Mpac 2500 can also be cascaded for large, private network applications, the vendor claimed.

It can support up to 64 logical channels for each physical communications port, irrespective of the line speed. It can also support a maximum of 128 simultaneous calls, the vendor said.

The switcher provides one-digit call routing and, when used with the vendor's Mpac 2000 packet-switching processors, provides electronic mail capability. The Mini Node is compatible with other Mpac interface products that convert data terminals and computers to the X.25 protocol, the vendor said.

The product reportedly can also be configured on-site to meet the requirements of any X.25 interfaces currently in place.

It costs $17,440 for four X.25 lines and $20,710 for eight X.25 lines, Memotec said from 1441 Dunwoody Village Pkwy., Atlanta, Ga. 30338.

Buffer Fits All Micros

NORCROSS, Ga. — Quadram Corp. has introduced a universal printer buffer that reportedly can be used with all microcomputers and parallel printers. The parallel-in/parallel-out data buffer uses standard Centronics Data Computer Corp. signals and can draw needed power from a variety of printers.

The Microfazer has separate low-voltage power supply (9V, 500 mA) and standard calculator battery chargers can be used, the vendor reported. It receives data from the computer at up to 4,000 char./sec. The data is then transferred to the printer as rapidly as the printer can handle it, the vendor said.

Buffering of 8K-, 16K-, 32K- or 64K bytes is available in the four models of Microfazer. It is user-expandable from 8K- to 64K bytes using standard 64K-byte 200-nsec chips, the vendor reported.

The pricing for the four models is $159, 8K byte; $189, 16K byte; $225, 32K byte; and $299, 64K byte.

Quadram is located at 4357 Park Drive, Norcross, Ga. 30093.

Controller Enhanced

CHATSWORTH, Calif. — An enhanced single-unit error controller designed for use on asynchronous teletypewriter-compatible terminals is available from Micom Systems, Inc.

Model 596 Error Controller functions are said to include automatic retransmission on error, asynchronous-to-synchronous conversion, full- to half-duplex conversion and data compression.

Users of asynchronous teletypewriter-compatible terminals can transmit data synchronously up to 9,600 bit/sec, convert to half-duplex mode to access the dial network, access Viewdata and Teletex networks with asymmetrical data rates and automatically recover from phone-line errors, according to the vendor.

Switch settings are said to allow for choosing between different options including full- or half-duplex, local echoplex, data compression and two types of buffer overflow control.

Data rates are also switch-selectable and include 600, 1,200, 2,400, 4,800, 9,600 bit/sec and receive/send combinations of 1,200/75 bit/sec and 600/75 bit/sec.

Priced at $795, the controller is available from Micom Systems, 20151 Nordhoff Ave., Chatsworth, Calif. 91311.

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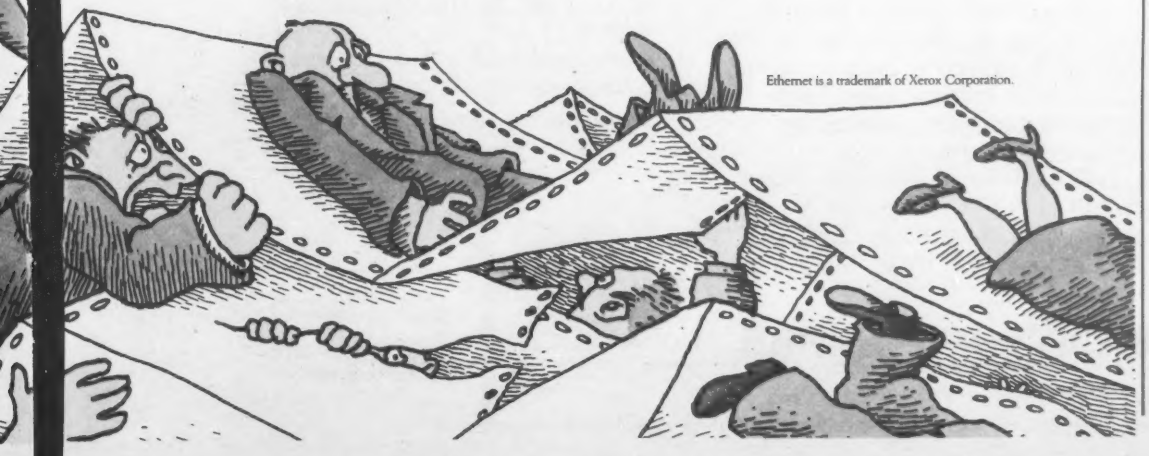

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Firm Debuts Quiet Printers

ETTERS, Pa. — HMW Enterprises, Inc. has unveiled 80- and 132-col tabletop printers that reportedly feature 300 line/min operation with less than 20 db noise.

Both the Whisper printer Models 40-80 and 80-132 are designed for noise-sensitive environments such as hospitals and banks. They can interface with Ascii serial RS-232C or 20 mA current loop selectable between 150- and 9,600 bit/sec, according to the vendor.

Both printers include internal set-up switches, control right- and left-hand margins, forms length, print line/in., diagnostic printout and communications protocol, the vendor said. A print chain mechanism provides up to six copies.

Model 40-80 with RS-232C/20 mA interface is $3,695 for a single unit. The Model 40-132 with RS-232C/20 mA interface is $4,995.

The printers are available from HMW, 604 Salem Road, Etters, Pa. 17319.

Comten System Supports 3600

ST. PAUL, Minn. — NCR Comten, Inc. has unveiled an operating system and family of software products implemented under its Communications Network Architecture and designed to provide network software for pre-Systems Network Architecture (SNA), SNA and the emerging networking technologies.

Comten 3600 System Control Software (SCS) is reportedly used as an operating system for the vendor's Model 3600 communications processors. SCS software is said to accommodate local/remote processing, host application selection/switching and data/message switching. It incorporates IBM-compatible Emulating Processing, Network Control Program, Advanced Communications Function/Network Control Program and Partitioned Emulation Processing.

It is also said to provide value-added programs and features such as Comten Multiple Access Facility, Communications Networking System, Statistics and Extended Access Control and X.25-1 interface to public data networks.

There is no charge for the Model 3600 communications processor operating system and incremental charges for other portions of the software, NCR Comten said from 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Concord Data Unveils Full-Duplex Modem

LEXINGTON, Mass. — Concord Data Systems, Inc. has introduced a 1,200 bit/sec full-duplex modem with a fully automatic adaptive equalizer.

The CDS 212 was designed to function on two-wire switched networks, utilize high-speed, low-power microprocessors and to perform signal processing and control. The modem operates in both synchronous and asynchronous modes at a speed of 1,200 bit/sec, the vendor said.

The modem costs $770 from Concord Data Systems, 442 Marrett Road, Lexington, Mass. 02173.

Rixon Modem Out — Originate Only

SILVER SPRING, Md. — Rixon, Inc. has announced the T113C, an originate-only modem that transmits and receives asynchronous serial binary data.

The unit operates at up to 300 bit/sec full duplex over the direct-distance dialing switched network. The modem employs a large-scale integration architecture and is compatible with Bell and Rixon 212A data modems, the vendor said.

The unit costs $345, the vendor said from 2120 Industrial Pkwy., Silver Spring, Md. 20904.

Autonet Ties In-House to Public Net

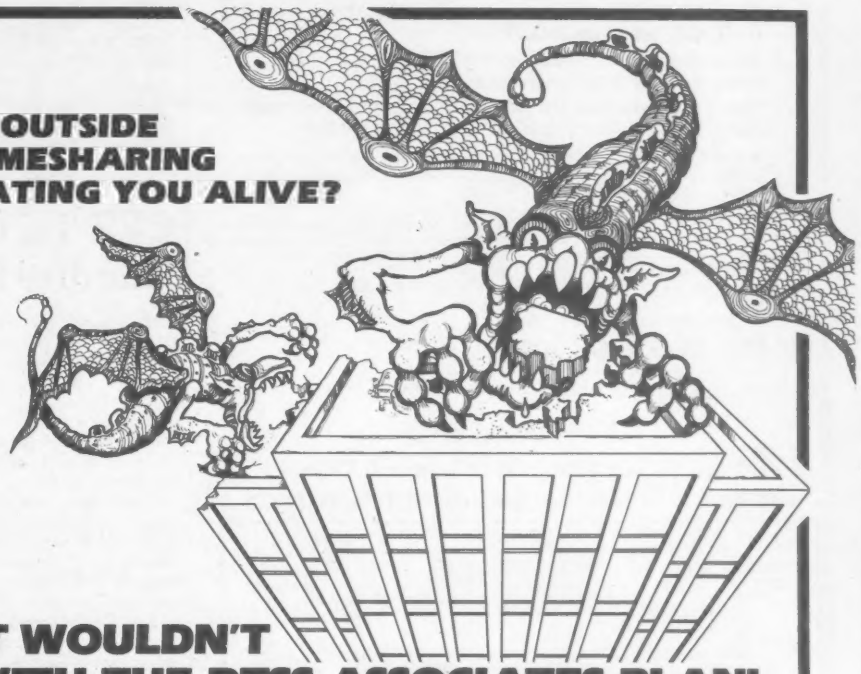
ANN ARBOR, Mich. — The Autonet Division of Automatic Data Processing, Inc. has enhanced its packet-switching data network to allow connection of in-house processors to the public data network.

Autonet offers direct toll-free access in more than 250 domestic locations. The network can be connected to other public networks as well as international record carriers to provide packet switching to more than 30 countries, the vendor said.

Autonet uses a specialized packet-switched protocol, which includes end-to-end error control, intelligent alternate-path routing and automatic-answer dial-backup facilities to minimize the impact of line or node failures. A dial-backup option is available to protect against extended circuit outages between the host processor and Autonet, the vendor said.

Autonet includes 185 intelligent communications processors with links to more than 115 host processors. Client processors are connected via the X.25 protocol or through an asychronous interface. Autonet supports all commonly used asychronous hard-copy and CRT terminals operating at speeds of up to 120 char./sec over dial-up lines. Higher speed terminals are supported at dedicated connections, the vendor said.

Autonet is billed on an as-used basis. The network costs $3 per connect hour during prime time and $1 per hour during off-peak hours. Volume discounts are available, the vendor said from 175 Jackson Plaza, Ann Arbor, Mich. 48106.



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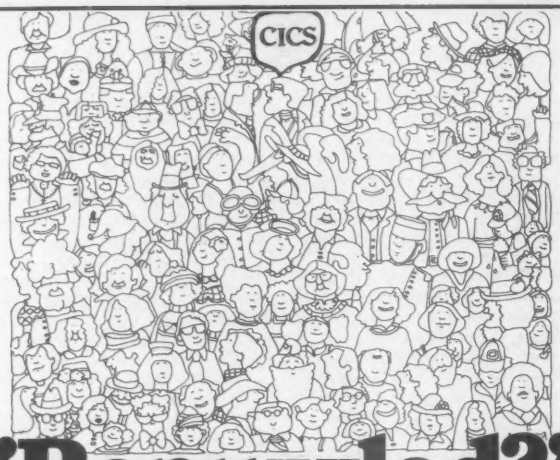

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Full-Duplex Fiber-Optic Modem Allows Variable Transmission

FRAMINGHAM, Mass. — A synchronous, full-duplex fiber-optic modem designed to allow transmission from 5,000 ft to 24,000 ft has been unveiled by Fibronics International Ltd.

The Model FM-802 reportedly offers internally selectable data rates from 150 bit/sec to 96K bit/sec in the synchronous mode and asynchronous transmission up to 20K bit/sec. The modem can be used with a received clock permitting master/slave operation.

The self-testing modem is said to be RS-232-compatible. Each unit contains an optical transmitter, receiver, power supply and power cord. The unit costs $750 from the firm at 655 Concord St., Framingham, Mass. 01701.

Link Transmits At 40M Bit/Sec

ATTLEBORO, Mass. — A fiber-optic digital data link with a transmission rate of 40M bit/sec is available from Augat, Inc.

The D40 Fiberoptic Data Link reportedly has a bit error rate of less than 10 to the negative eighth power and its maximum recommended distance is 500 meters. The cost for a single D40 data link is $310, with quantity discounts available from the firm at 40 Perry Ave., P.O. Box 1037, Attleboro, Mass. 02703.

CRT Terminal Handles Unix

SKOKIE, Ill. — Teletype Corp. has introduced a CRT terminal that is said to be compatible with Bell Laboratories' Unix and other Ascii-oriented systems.

The 4424 is a general-purpose interactive terminal capable of supporting a variety of host software programs, the vendor said.

Sixteen user/host definable "soft" keys are available to support specific applications with specialized functions. The functions reportedly shorten and simplify routines, according to the the vendor.

The keyboard display costs $4,207 from Teletype Corp., 5555 Touhy Ave., Skokie, Ill. 60077.

Modems Operate Over Single Line

NEWPORT, R.I. — Avanti Communications Corp. has announced two modems designed to operate synchronously over unconditioned voice-grade lines of any length.

The Avanti 2400 and 4800 modems are said to allow two independent channels to operate over a single leased line and can be used in point-to-point or multipoint configurations.

With the asynchronous option, the modems can reportedly operate as one asynchronous channel, two asynchronous channels or one asynchronous and one synchronous channel.

The desktop version of the 2400 costs $1,200; the rack-mounted version costs $1,000. The desktop version of the 4800 costs $2,400; the rack-mounted version costs $2,150.

The asynchronous dual-channel option costs $395 for all models.

Avanti is located in Aquidneck Industrial Park, Newport, R.I. 02840.

Talking Terminal Uses Telephone

ARLINGTON, Va. — Telephone Computer Co. has introduced a talking communications terminal that allows bidirectional communications between the telephone and a computer system. It operates over voice-grade lines.

Comput-A-Talk allows data entry by telephone with human-like voice feedback when a number or character is entered, the vendor said. It has a 144-word vocabulary, which is expandable to 576 words.

Application programs that now use keyboard input of commands and data can be run using the device and an RS-232C terminal, the vendor said.

Comput-A-Talk is available for $995 from the Telephone Computer Co., 1911 Fort Meyer Drive, Arlington, Va. 22209.

Smart Modems Custom Built

CALABASAS, Calif. — Racal-Vadic, Inc. is reportedly offering full-duplex modems on a 50-sq-in. printed circuit board.

The intelligent Bell 212A 1,200 bit/sec and 300 bit/sec modems are designed to customer specifications and are designed on custom large-scale integration chips. These circuits include modulator, demodulator, transmit and receive filters, carrier detector and answer tone generation and detection, the vendor reported.

The modem units start at $325 and are available from Racal-Vadic, 222 Caspian Drive, Sunnyvale, Calif. 94086.

Mouse Designed For Drawing Curves

OAKLAND, Calif. — Hawley Laboratories has introduced a high-resolution digital device for smooth drawing or tracing of curves or for direct movement to any point on the display screen, the vendor said.

The Hawley X063X Mouse reports 200 motion increments per inch of travel on each axis. Proportion of mouse-to-cursor travel is software-controlled to suit the application.

Three buttons are provided for software-defined functions such as selecting, activating and toggling menu items or displayed objects.

The X063X Mouse is fully compatible with all standard HX mouse interfaces, the vendor said. It costs $415 from Hawley Laboratories, 1741 8th St., Berkeley, Calif. 94710.

PACKET SWITCHING:

GETTING THE INFORMATION THROUGH

BY ROY D. ROSNER

Packet switching has emerged as a telecommunications technique with unlimited potential. Because it permits communications resources to be used at utmost efficiency, packet switching can adapt to a wide range of user services and user demands.

Public packet-switching networks have been built or are planned in more than 20 countries around the world, and numerous private and experimental networks are currently using packet switching.

Packet switching is used primarily in connection with computer and data communications. However, its effectiveness for voice, video and other wideband telecommunications services has been demonstrated and, as advanced data processing techniques im-

Portions of this article appear in Packet Switching: Tomorrow's Communications Today, *by Roy Rosner. Copyright 1982 by Lifetime Learning Publications, a division of Wadsworth, Inc., Belmont, Calif. Printed with permission of the author and publisher.*

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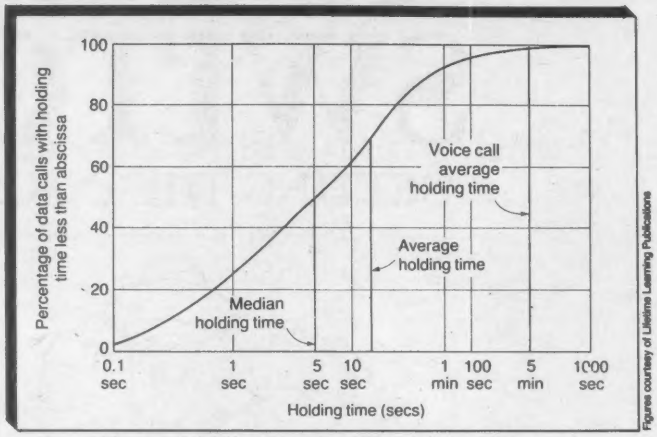

Figures courtesy of Lifetime Learning Publications

Figure 1. Distribution of Data Call Holding Times

prove the computer processors that form the heart of the packet switches, this application of the technique undoubtedly will become widespread.

Current approaches to integrated/distributed networks are based heavily upon the technology of the common user telephone networks, with the concept of integrated services digital networks (ISDN) being promoted from the viewpoint of the telephone network and equipment suppliers. The ISDNs are, for the most part, based upon the 64K bit/sec pulse code modulation hierarchy, with the computer network user fitted into the overall hierarchy on a subchannel basis.

This is all well and good, since regardless of the approach taken, integration of data communications services together with voice and other, wider bandwidth services is leading to more efficient and economical handling of the ever-increasing quantities of data transmitted over long distances.

However, it is only through the recognition of the fundamentally bursty nature of most forms of communications and the matching of the communications techniques to the bursty and statistical nature of the network users that the ultimate in flexibility and economy can be realized. Packet switching, originally conceived as a secure voice processing technique, but now generally recognized as the most flexible approach to remote terminal data communications, provides the ability to match the bursty communications user to the continuum of communications media.

Plunge in Costs

The ultimate integration of diverse communications demands through packet networks will result in unprecedented reductions in the unit costs of data communications — cost reductions that are critical to the continued growth of the information society and the penetration of information services to the small user in either the business or home market.

The relatively short length (in time) of data communications messages or transactions is widely recognized as being the source in the limited and costly application of conventional switching techniques to terminal-oriented data communications. Figure 1 shows a typical sample distribution of user message lengths (holding time), with both the average and median data holding times being much shorter than the average holding time for voice calls. In addition, the utilization of communications resources by data communications applications tends to be highly asymmetrical.

For example, in most data base applications, as well as public information applications (such as videotext), the quantity of information going from the computer to the terminal will be 100 or 1,000 times as great as that going from the terminal to the computer. Thus, flexible techniques are required to handle the very short communications bursts efficiently, as well as the dichotomy of channel loading in the two directions of communications transmission associated with a typical user exchange through a network.

Voice Origins

Interestingly, the origins of packet switching are more strongly based in voice communications than in data communications. This fact is not often recognized, since current applications of packet switching deal primarily with data- or computer-based communications. Paul Baran and his associates at Rand Corp. in the early 1960s are generally credited with "inventing" packet switching in conjunction with their work on the problem of making military voice communications circuits safe from wiretapping and immune from interruption due to the destruction of part of a network.

These ideas started with the notion of breaking a voice conversation between two parties into short, separate pieces (packets), as depicted in Figure 2. At each switch, the pieces of a call would be mixed with pieces of other calls and sent, piece by

piece, over several different routes to the destination.

Only at the destination would it be possible to collect all of the pieces and, after reassembling them in proper order, make the voice intelligible. If the wires were tapped anywhere in the network, or if communications between microwave relay points were intercepted, all that would be heard would be the garble of dozens of interleaved bits and pieces of many conversations.

Although these ideas were published in 1964, the technology was not really available to perform the complex processing, routing and control functions required to implement this concept in a large-scale network.

Arpa Efforts

Meanwhile, the Advanced Research Projects Agency (Arpa) of the U.S. Department of Defense was supporting numerous large computer installations at various universities and laboratories doing basic and applied research throughout the U.S. Because of differences in time zones, computer center work load and specialized hardware and software at the various installations, it seemed desirable to find a way to share resources that would enable the computer facilities to operate more efficiently.

As no appropriate networking capabilities were available, Arpa embarked on developing them. The result was the application of packet switching to data communications and the deployment of the Arpanet as the prototypical packet-switched data network.

The concept of packet switching is based on the ability of modern, high-speed digital computers to act on transmitted information so as to divide the calls, messages or transactions into pieces called packets. Packets move around the network, from switching center to switching center, on a hold-and-forward basis, where each switch holds a copy of each packet in temporary storage until the switch is sure that it has been received properly by the next switch or by the destination user.

This form of operation permits the network to achieve low overhead for short messages and eliminates the call setup time that is required in conventional circuit-switched telephone networks. Because all communications are broken down into similar component pieces, the packets, long messages and short messages can move through the network with a minimum of interference with each other. By moving the packets through the network in (nearly) real time, the switches can adapt their operation quickly in response to changing traffic patterns or failure of part of the network.

'Commercial' Developments

Packet switching has been "commercialized," largely through the efforts of Telenet (now GTE-Telenet),

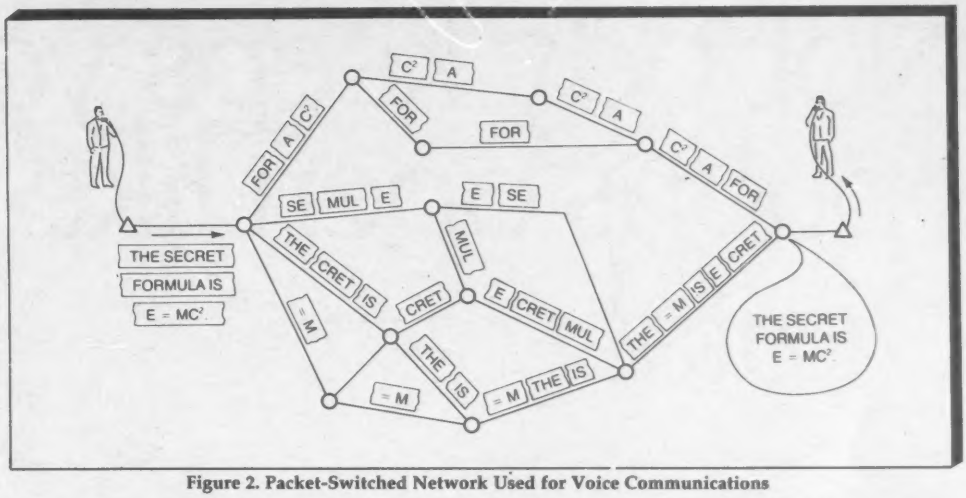

Figure 2. Packet-Switched Network Used for Voice Communications

the Trans-Canada Telephone System (Datapac), the postal, telephone and telegraph (PTT) companies of France, Great Britain and other countries, as well as numerous other network and equipment vendors. Their efforts have caused the Arpanet technology to evolve into a comprehensive, multilayered structure of networking systems, architectures and protocols.

By 1976, the Consultative Committee for International Telephone and Telegraph (CCITT) systems had adopted the widely accepted X.25 standard for data user interface to a public packet-switched network, allowing user equipment and software to be developed as commercial products to utilize packet-switching services.

Significantly, the work at standardizing the interface to packet-switched networks did little to de-

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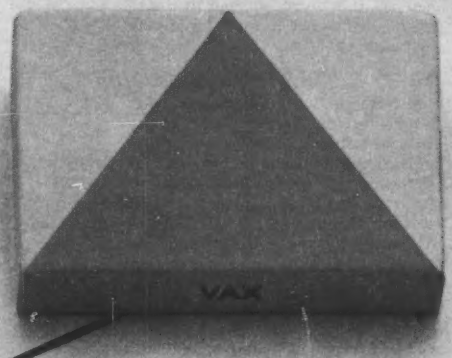

By now, everyone understands the need for standard communications protocols. Without them, an electronic Tower of Babel would surely ensue. But there have to be different standards for different networks. A local-area network is different from a wide-area network. A public network is different from a private one.

No single universal standard has emerged. Nor is one likely to. There are simply too many diverse networking environments, each fulfilling specific, mutually exclusive needs.

That's why Digital is committed to supporting and, in fact, actively promoting the more important standards now surfacing in the various environments.

Our goal is to offer our customers a range of standards to achieve any combination of networking objectives. And we've been pursuing that goal for many years.

A forward-thinking strategy.

When we first developed our networking architecture, we understood the need for flexibility. We consciously adopted an architectural strategy that would allow our networking software to work freely with a wide range of protocols, including some that didn't even exist at the time.

The success of that strategy is now becoming apparent. As more vendors enter the networking field, Digital is uniquely positioned to offer compatibility with the emerging protocols. We've gone farther than anyone to assure that your options are open.

X.25 and other public networks.

Digital offers the X.25 protocol for use with public packet-switched networks such as Datapac (Canada), Transpac (France), and PSS (U.K.).

But when used with our computers, X.25 is much more than a simple link. We can provide you with the higher-level protocols that will take your systems beyond mere communications and into the sophisticated functionality that has made us a leader in networking software.

Hierarchical networks.

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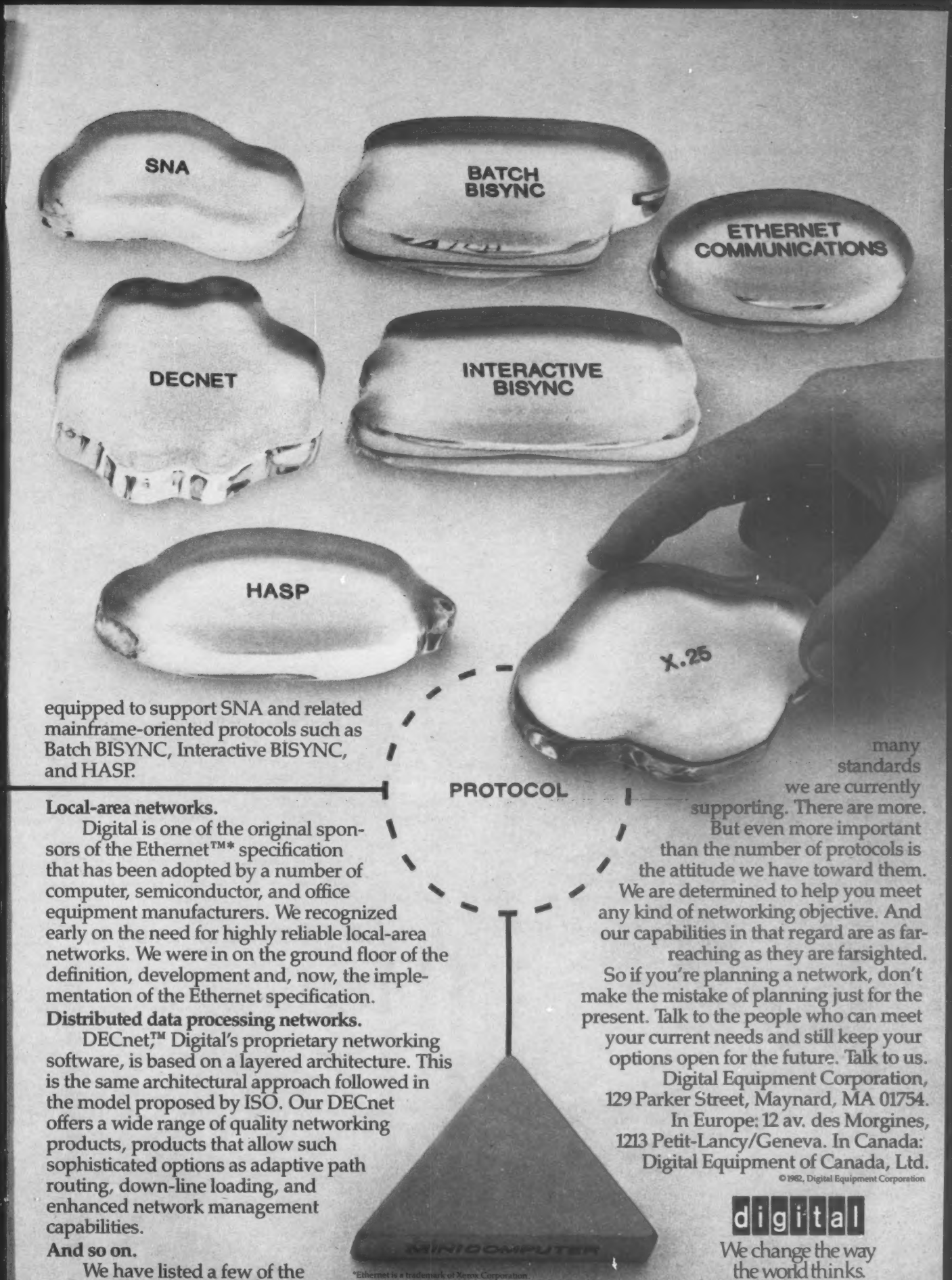

equipped to support SNA and related mainframe-oriented protocols such as Batch BISYNC, Interactive BISYNC, and HASP.

Local-area networks.

Digital is one of the original sponsors of the Ethernet™* specification that has been adopted by a number of computer, semiconductor, and office equipment manufacturers. We recognized early on the need for highly reliable local-area networks. We were in on the ground floor of the definition, development and, now, the implementation of the Ethernet specification.

Distributed data processing networks.

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And so on.

We have listed a few of the many standards we are currently supporting. There are more. But even more important than the number of protocols is the attitude we have toward them. We are determined to help you meet any kind of networking objective. And our capabilities in that regard are as far-reaching as they are farsighted. So if you're planning a network, don't make the mistake of planning just for the present. Talk to the people who can meet your current needs and still keep your options open for the future. Talk to us.

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fine how the internal operations of the network should proceed. Thus, many different implementations of packet switching have been developed, which, while all providing standard interfaces, are largely incompatible on a switch-to-switch level. As a result, the interoperation of different networks has to take place at a fairly high level of protocol, through interface "gateways" as defined by the X.25 CCITT standard, which in effect makes an entire network appear as a subscriber to the other network at the gateway.

The internal network operation within a given vendor's network can be highly complex, with multiple paths, dynamic routing, multiple priorities and many redundancy features, or it can be quite simple, with the network performing nothing more than the functions of asynchronous time division multiplexer. However, the former approach is generally needed in order to achieve the advantages and reliability generally attributed to packet-switched networks.

Hypothetical Network

Figure 3 illustrates a portion of a hypothetical packet-switched network. User A is a subscriber attached to Switch 1, and User B is a subscriber attached to Switch 3. As an example, we shall trace the flow of a three-packet message from User A to User B, focusing on switches 1, 2, 3 and 4. It is important to remember, however, that many other packets flowing between other users are simultaneously moving throughout the network.

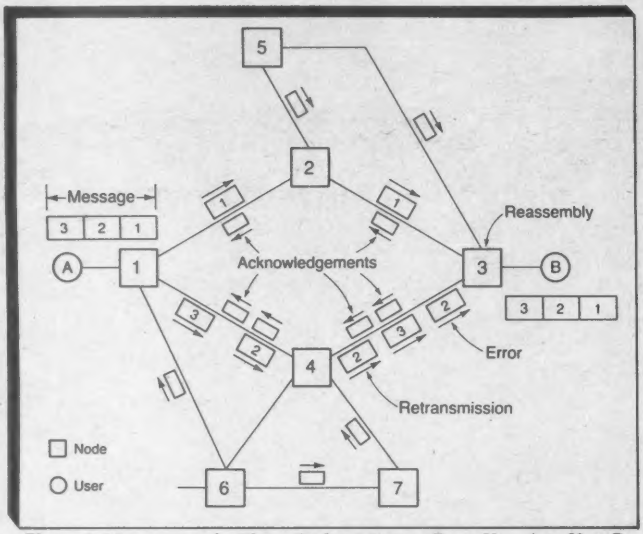

Figure 3. Movement of a Three-Packet Message From User A to User B

The flow of the message is initiated by the transmission of Packet 1 between User A and Switch 1. Depending upon the exact implementation, this first packet may be simply a new message request or may be the first block of user data. This distinction, related to the difference between switched virtual circuits and permanent virtual circuits, is beyond the scope of this discussion.

When Switch 1 fully receives the first packet, the switch follows a set of routing rules to transmit Packet 1 toward its destination by sending it via Switch 2. In the meantime, Packet 2 is moving from User A into Switch 1. During this time, the conditions in the network change (for instance, a large amount of traffic from Switch 5 arrives at Switch 2), so the second packet of the message, arriving at Switch 1 soon after the first one, is routed via Switch 4. The third packet of the message, arriving at Switch 1 soon after the second, is similarly routed via Switch 4.

After being received correctly by Switch 4, the second packet is transmitted to the destination switch, Switch 3. But during that transmission an error occurs. When Switch 3 receives Packet 2, the error-detection mechanism is able to detect the error and requests a retransmission of Packet 2. While this is occurring, Packet 3 has been transmitted immediately behind the first (and errored) copy of Packet 2. As a result, the second (correct) copy of Packet 2 is received at Switch 3 after Packet 3.

If we look at the network from the perspective of Switch 3, first Packet 1 is received, then Packet 3 and finally Packet 2. If Switch 3 delivered the packets to the destination — that is, to User B — in the same order that they arrived at Switch 3, User B would receive the packets in a different order from that in which they entered the network.

Furthermore, by other interplays of the interswitch protocols, error-control mechanisms and packet-flow mechanisms, it is possible to lose packets completely as well as to create duplicate copies of packets. In order to protect against the several types of network-introduced errors, the network has to contain a certain amount of redundant overhead information, which has to be transmitted through the network in order for the switches to handle the transmis-

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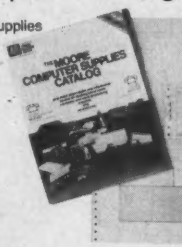

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sion and delivery of a call or message properly.

The key point here is that the integration of data and voice communications in common packet-switched networks is dependent upon the tailoring of both the packet handling and overhead structures to the characteristics of the various traffic types.

Digitized voice can be combined with other digital data services into a common, packet-switched network by the proper design of the network interface and flow control protocols. The integrated voice and data network shown in Figure 4 illustrates the point.

Voice digitization may take place at the user instrument, at any concentrator in the system (such as an access switch or PBX) or at the input to the packet switch. If the voice processors are placed at a concentration point or at the input to the packet switch, their cost can be shared among many users, because the processors can be pooled to handle the number of lines at the switch that are active at any time and not the total number of end users in the network.

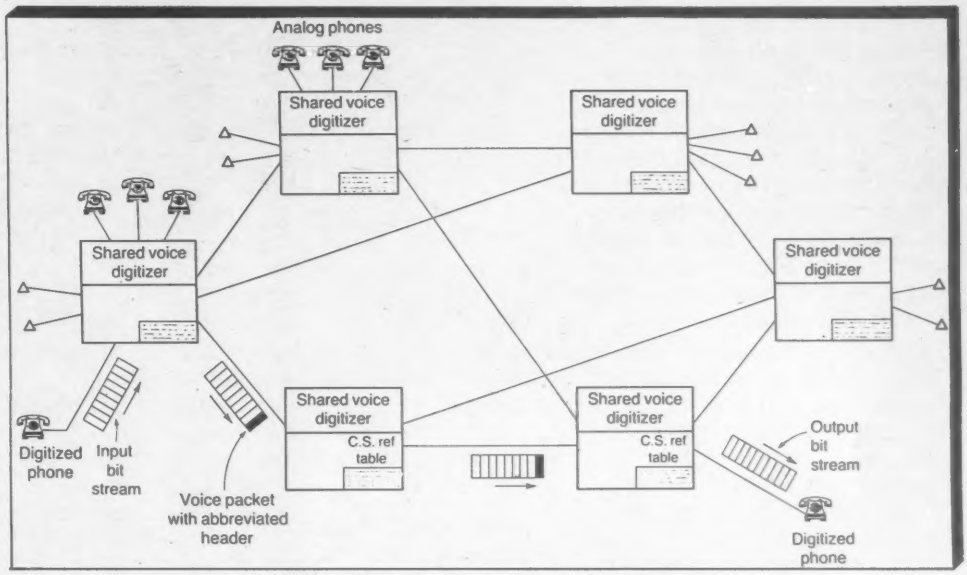

Figure 4. Integrated Voice/Data Packet Network

In order to operate efficiently in the integrated mode, the voice packets have to be class-marked so that they can be handled as expeditiously as possible. Voice packets need not be error checked, since there is no time to retransmit errored voice packets. Packets received with errors will be processed at the output speech synthesizer and will, at worst, result in a short noise burst.

Voice packets will contain a relatively small number of bits, and it is important to minimize their overhead. This is done by establishing a fixed path through the network during the call setup and transmitting all packets associated with that call over the same path. A table entry in the memory of each switch along the end-to-end path that associates the packets with a logical circuit is needed. In this way, the only overhead needed on each packet can be reduced to the logical circuit reference number, which each switch uses to determine the proper handling and routing of each packet associated with a particular call.

'Like so much of the processor-driven technology, the cost of low bit rate voice processors, at rates of 32K bit/sec per voice channel, down to possibly as low as 4,800 bit/sec, will be trivial by comparison with the other aspects of the network within the next five years, further enhancing the practicality of the integrated approach.'

Network Efficiency

The overall efficiency of integrating voice and other services into common packet-switched networks relates to the ability to create the needed protocols, as well as the cost-effectiveness of the devices used to convert analog voice into digital bit streams. Like so much of the processor-driven technology, the cost of low bit rate voice processors, at rates of 32K bit/sec per voice channel, down to possibly as low as 4,800 bit/sec, will be trivial by comparison with the other aspects of the network within the next five years, further enhancing the practicality of the integrated approach. In addition, the combination of data entry and voice answer-back functions will also mandate the functional integration of voice and data systems, with packet switching emerging as the most cost-effective approach.

Another movement toward service integration via packet switching is the entire technology of local networks, a large body of which are based upon a block transmission protocol which, in effect, creates packet-switching networks without discrete packet switches.

By distributing the protocol handling and intelligence to the user terminals and user interface devices, packets are in effect randomly broadcast into the common channel (either wire, cable, fiber-optic, local radio or even a satellite channel), depending upon the relatively low duty-cycle of the channel and collision-detection mechanism of the terminal devices to keep individual transmissions separated. The individual bursts, wheth-

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DATA SECURITY

The first in a series of messages on advanced technologies from Honeywell Information Systems.

Preventing unauthorized access to data stored in computers is no longer an esoteric, back-room problem. The data is so valuable an asset that to have its integrity destroyed, altered or in some other way violated unintentionally or by artful programming can cause irreparable—even fatal—harm to an organization.

With any large, general-purpose timesharing system, the easy sharing of both programs and data would seem incompatible with security. Yet the three-dimensional data security mechanism in the Honeywell Multics system not only makes controlled sharing possible and convenient, but has earned Multics a reputation as the most secure, general-purpose system on the market.

The Standard Defense

Data security usually is provided by specialized (i.e. incremental to the basic system) operating software that controls the sharing of computer resources, programs and data. To prevent unauthorized access to data or programs, this operating software can use a set of tables listing the authorized users along with their access rights—such as read, write, execute. The operating system scans this table on each reference to a block of data. In theory, it's an unbreachable defense.

In practice, it's vulnerable, largely because operating systems—composed of many complex programs with frequent modifications and patches—contain errors. The more complex the system, the more patches and alterations it has and the more susceptible it is to exploitation.

Honeywell's Approach

Honeywell has reduced the complexities of the final software system. Multics was designed and developed so that its security mechanisms could grow without reorganization. Assuming at the outset that it was impossible to foresee all problems at the design stage, the Multics software was written to be easily redesigned (rather than patched) should problems crop up upon implementation.

Functions were added as subsystems, rather than modifications. As a result of these and many other design decisions, exploitable design flaws in Multics, for all practical purposes, are nonexistent—even though the current operating system has matured over many iterations.

Discretionary Access

As the first defense, Multics provides a discretionary access control mechanism consisting of a table that lists the names of those authorized (and denied) access to each and every file. This table, called the Access Control List (ACL), also lists the access modes—read, write, execute—allowed each user.

All authorized users also have a unique personal identification (ID) plus a project identification. The personal ID is authenticated by an encrypted password stored in the system. The encryption algorithm, however, is a one-way algorithm so there is no algorithm for recovering the encrypted password in clear form. When at log-in, the system requests the user's password, his terminal print mechanism or screen is automatically turned off

The call bracket defined by the ring numbers associated with each program is used to restrict the sequences in which programs can execute. In this example, the user operating in ring 6, references in turn programs A, B, C, and D, with ring numbers (6,6,6), (4,4,6), (2,5,6), and (0,0,4). When program A calls program B, the user's ring changes to 4, the highest and only ring number in program B's execute bracket. When B calls program C, the user's ring number remains the same. When B calls C and C calls D, the ring number changes temporarily to 0. The ring numbers of these programs prevent program A from calling directly to program D. The user must pass through program B, called a gate, to reach program D. The ACL and AIM settings on gates can be used to control access to inner ring programs and data, making it much easier to protect them from misuse. The bottom line is that the user is secure in the knowledge that the hardware and software mechanisms of Multics protect his programs and data from unauthorized access.

or masked, so that the password is never displayed. Passwords are controlled and can be changed by each user. Software tools can force users to change their personal passwords within a given time.

Non-discretionary Access
To prevent inadvertent (or intentional) release of data, the system also provides an extended access control system called Access Isolation Mechanism (AIM).

AIM protects against unauthorized release of data by assigning levels of classification to data files and levels of clearance to the user. It then matches clearances and classifications. For "read" and "execute" access modes, the user's clearance must be higher or equal to the classification of the data block. For "write" access, the clearance must match the classification.

AIM defeats the "Trojan Horse" ploy whereby a programmer hides within a legitimate, often-used program some additional code completely unrelated to the documented function of that program. That code, for instance, might search the storage system for data to which the programmer has no access.

Hardware Rings
The two security mechanisms are protected and further enforced by specialized hardware, called the Ring Mechanism, which makes Multics a uniquely secure repository.

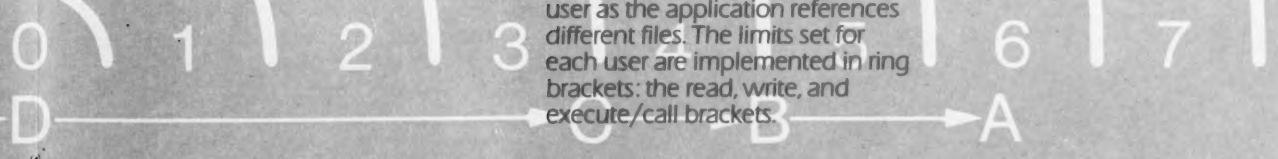
Files dwell within rings, numbered from 0 to 7. The lower the number, the more privilege is conferred on the executing program and its associated files. A special hardware register keeps track of the ring number in which each user's application is executing. The ring number increases or decreases within the access mode limits set for each user as the application references different files. The limits set for each user are implemented in ring brackets: the read, write, and execute/call brackets.

User access to files is determined by all three mechanisms: ACL, AIM, and the ring brackets. The user can process a file only if he is permitted the kind of access authorized by the security mechanisms.

The ring mechanism also protects itself from attack. Ring numbers of files can be changed only by authorized users. The operating system checks every attempt to modify ring numbers to assure that the attempt is legitimate. The rings also protect the users' subsystems.

User Control
When an authorized user changes the protection modes on a file, these changes are reflected to all users of that file immediately. That is, access permissions and denials are dynamic and are re-calculated by the hardware with no loss in system performance during the execution of every computer instruction.

More on Data Security
For an in-depth paper on Multics Data Security call our toll free number 800-343-6294 (in Massachusetts call 617-552-2264) or write Honeywell, 200 Smith Street (MS 487), Waltham, Massachusetts 02154.



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er voice or data, are received and processed on an individually addressed basis, thus enhancing the ease of integration of various services and traffic sources.

In addition, the ability to interface local-area networks with national or international communications facilities will be accomplished easily by operation at the packet level, as long as the long-distance networks are able to ensure relatively low transit delay times and fairly consistent delay variance. Under such conditions, the interconnection of different local-area networks via long-distance networks is achieved with a large measure of protocol and channel structure independence.

User's Perspective

The data communications user or information systems vendor should find the ultimate integration of disparate systems in common networks both an opportunity and a challenge. From the data communications perspective, the ultimate result will be significantly reduced cost per bit, together with the opening of a myriad of new customer applications and service facilities. The challenge exists in achieving the needed protocol layering, separating the applications protocols from the communications functions, so that the flexibility promised by the network implementations will be achieved.

While packet switching has been in practical use for more than a decade and in commercial-carrier operation since 1973, the events of the summer of 1981 may be the most important contributor to its explosive growth in the 1980s. After many years in developing its own Systems Network Architecture (SNA), IBM announced support for the X.25 packet-switching standard. While not replacing SNA among IBM computers and terminals, the X.25 support provides most IBM product lines the ability to readily interface public networks, specialized private networks and networks containing non-IBM data processing equipment.

This step by IBM not only greatly increases the potential user community for packet-switched networks,

'While packet switching has been in practical use for more than a decade and in commercial-carrier operation since 1973, the events of the summer of 1981 may be the most important contributor to its explosive growth in the 1980s.'

but also greatly enhances the future growth of X.25-based systems by ensuring nearly universal applicability across all DP product lines.

On the other side of the network interface, a major announcement by AT&T established packet switching as a basic communications service offering by the world's largest telecommunications supplier. AT&T will offer packet-switching transport services, based upon the X.25 standard, as a basic regulated communications service.

As a basic service, the amount of processing that will be performed in the network will be severely limited, especially in comparison with the Advanced Communications Service (ACS) proposed by AT&T in 1978. Many of the processing features of ACS will be offered by AT&T, but as enhanced services through the

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AT&T fully separated subsidiary, which may be in operation by late this year.

However, AT&T will be able to provide packet-based communications anywhere in the U.S. under present service concepts for the transmission of data. Since AT&T is rapidly converting its facilities in many areas to digital operation, even for basic voice services, packet-switching services will be available in areas that could not be served economically by the specialized carriers and value-added networks.

It is also likely that in the not-too-distant future, packet services will be available to most residences. Such a step will be highly desirable to bring many data services to the home market, supporting home computing, videotext, teletext and general information services. This step will be instrumental in the transition toward integrated voice and data services using packetized operation.

Packet switching is likely to provide the most cost-effective route to distributed/integrated voice and data networks. Now, with the support of two of the world's largest corporations, it is clearly the best way to meet the data communications demands of the wide range of data and information systems already in widespread use. Products ranging from single-chip protocol converters to massive switching processors are already available from dozens of sources.

In addition to the public networks, turnkey private networks can be established for relatively small users in a matter of weeks. Combined with satellites and local networks, packet operation will provide the communications foundation upon which the information age of the 1980s will grow and flourish.

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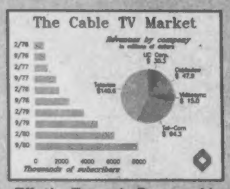

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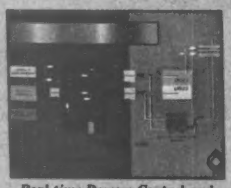

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About the Author

Roy Daniel Rosner was appointed director of advanced planning for the U.S. General Services Administration's Automated Data and Telecommunications Service in 1980. He is responsible for planning the future direction of telecommunications and DP services and facilities used by the U.S. government.

From 1970 to 1980, Rosner was with the Defense Communications Engineering Center in Reston, Va. He was instrumental in the conception, approval and design of the Autodin II packet-switching data network for the Department of Defense. He served as chief of the System Control Branch with responsibility for development of automated control and management systems for the worldwide Defense Communications System.

Rosner earned his BSEE at Cooper Union, an MSEE from Syracuse University and an M.A. in administration from George Washington University. He is the author of Packet Switching: Tomorrow's Communications Today *and* Satellites, Packet Switching, and Distributed Communications, *both published by Lifetime Learning Publications, Belmont, Calif.‡*

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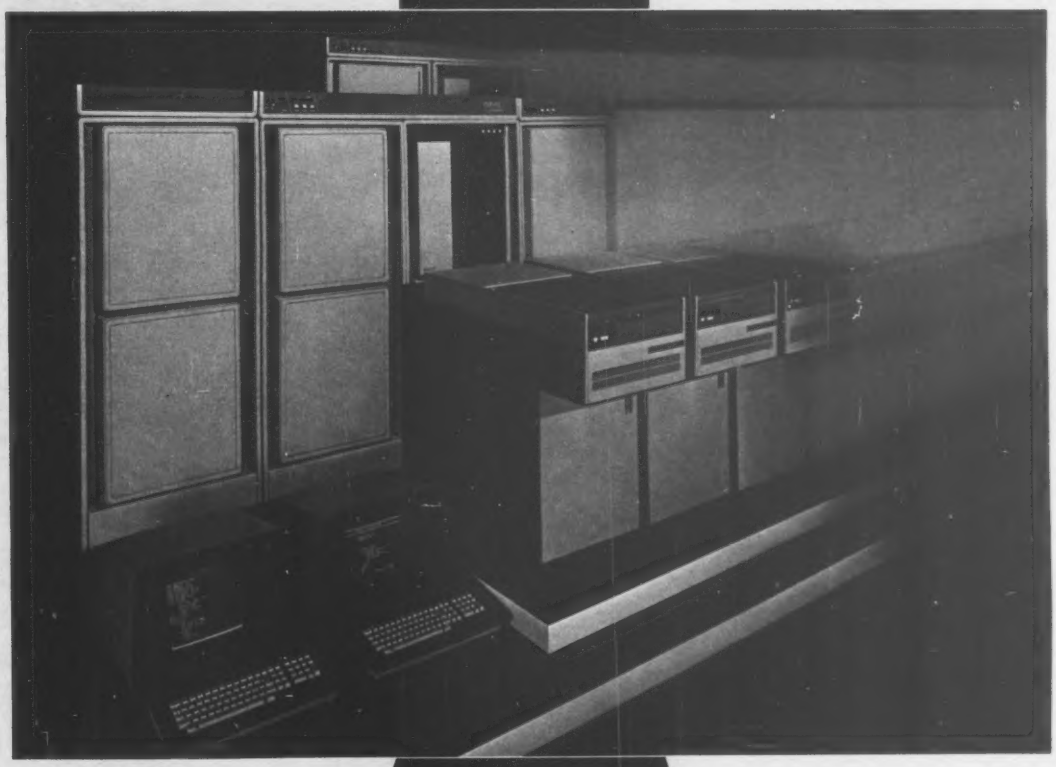

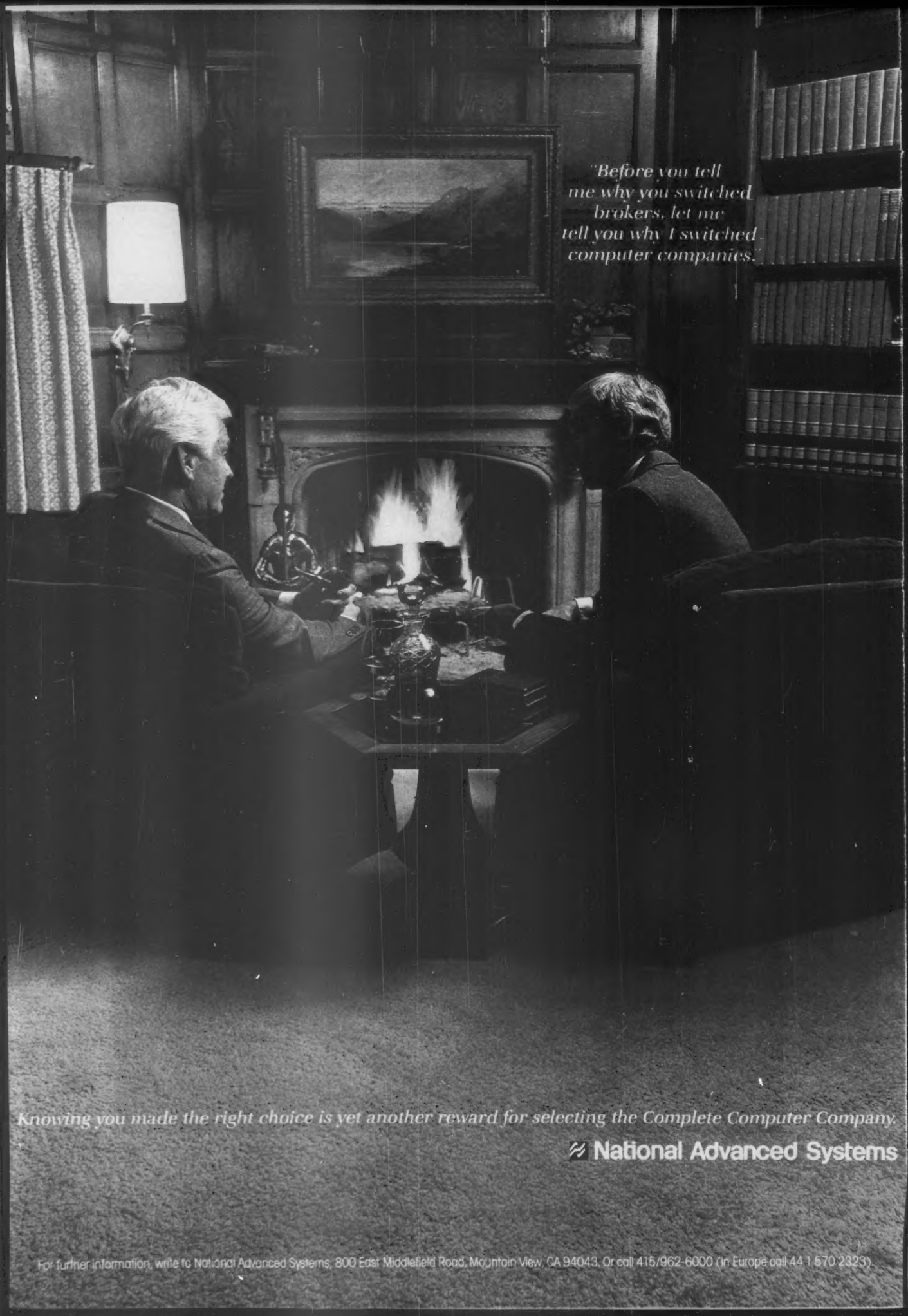
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CASH MANAGEMENT

BY RAY DICASALI

Maintaining liquidity is one of the most critical problems facing American business today. Because of this, corporate executives are paying more attention to managing the asset side of the balance sheet to strengthen overall corporate performance. Effective control and planning of cash receipts and disbursements are an essential part of this process.

Cash management is a frustrating problem because of the difficulty in getting an accurate picture of an organization's cash position. The picture managers want to see must consolidate information on collections and disbursements; it must also provide planning information so they can base investment and borrowing decisions on an accurate representation of their cash position. The picture they do see depicts a moving target — one that makes effective cash management difficult.

In most companies, the evolution of an overall cash

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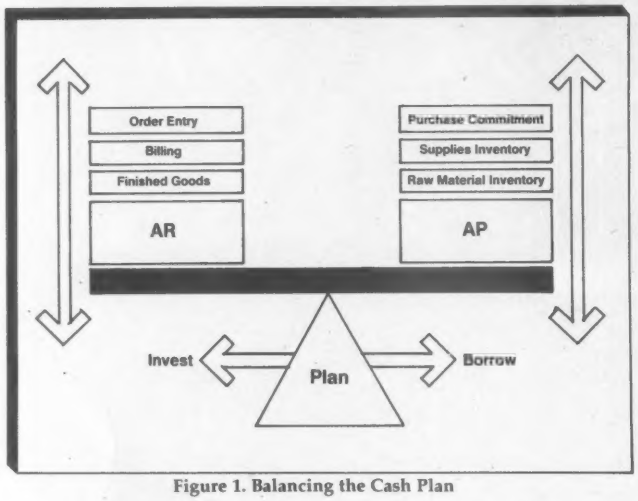

Figure 1. Balancing the Cash Plan

management system has been uneven. Some functions develop rapidly, others lag behind. There is so much relevant information coming from so many different sources that manual methods simply are not adequate.

An overall cash management system must provide:

- Timely forecasts of receipts and disbursements.
- Quicker collections of cash and/or receivables.
- Tight control over cash disbursements.
- Mobilization of funds for investing surplus funds.
- Analysis of cash costs and investment information.

An integrated cash management system can enhance the operating results of a company dramatically. It can transform the cash management function into a cash optimization activity.

An integrated cash management system includes three functions (see Figure 1):

- Accounts payable.
- Accounts receivable.
- The cash plan.

These systems have evolved as rapidly as interest rates have grown. The sharp rise in the cost of capital to support current business activities and fund expansion has stimulated this evolution; an increasing awareness of the potential benefits of cash management software has accelerated its use.

Let's see how the components of the new generation of cash management software can be used to present effectively and to mobilize a company's cash plan.

Accounts Payable

The greatest benefits to be gained from automating the accounts payable activity are the consolidation of related disbursement information and control over money owed to vendors.

The objectives of an automated accounts payable system are as follows:

- To safeguard working capital.
- To administer a flexible disbursement policy.
- To minimize the amount of cash necessary to support normal business activity.

To safeguard capital means to incorporate proper security and validation over the documents and data entering the system and the checks produced by the system. To administer a flexible disbursement policy, an automated system should provide timely and responsive tools for disbursing funds and managing vendor payment activities and the associated bank accounts.

To minimize the cash required to support disbursement policies, the system must be allowed to help in optimizing payment processes, discount policies, payment dates and bank accounts. The goal is to have a minimal amount of cash tied up in a nonearning form.

Essential Functions

To achieve these objectives, an automated accounts payable system must be able to:

- Validate and maintain a record of liabilities.
- Maintain vendor indicative and historical data.
- Administer an organization's cash disbursement policies.
- Report current and projected cash obligations.
- Establish accountability.

Validating and maintaining a record of liabilities establishes the obligation based on specific accounting documents. The "authorization-to-pay" cycle begins, and detailed invoice checking and validation takes place. The validation is necessary both for security reasons and to avoid coding errors and the processing of duplicate invoices. Document-matching functions that provide validation between the invoices, purchase orders, requisitions and receiving documents are critical to confirm the liability. Other key components include balancing controls and the ability to hold payments at any processing level.

The ability to *maintain indicative vendor and historical data* allows the system to build a data base that supports the ongoing payables operation. The system should maintain basic information such as vendor name and ad-

Buying Software That Fills the Bill

Determine what you need, not what it should look like or how it should be derived. Make a functional checklist instead of a feature checklist; grade requirements as essential, desirable and optional. Try to get an integrated solution that fills the essential needs and provides as many of the desirable and optional items as practical.

Include the end user. User input is critical in the selection process, since the purpose of the system is to help that individual. Do not neglect ease-of-use considerations.

Realistically analyze the timeliness of your problem and how soon you require implementation.

Consider cost. Cash management systems tend to provide a payback on the software investment. You should have some expectations in this area in order to make sure you are getting good value.

Implementing cash management software systems requires people, computers and expertise. Plan for assistance from data processing, accounting, financial and cash management areas, as well as peripheral individuals involved with financial analysis, credit, banking and investments.

Is the software technically up to date from both the data processing and current cash management standpoint? Does it have on-line capabilities, crossing all functions of the system? Especially important are areas that require real-time, on-line processing such as accounts receivable, cash application and interactive forecasting capabilities for cash planning.

Is the software package truly flexible? It must have the potential to handle your checklist for today and for the future.

Is the package a proven product? Are customers getting successful cash management results from the use of these integrated products, not just from one area?

The quality of the system is only as good as the level of support provided by the vendor. Make sure the vendor can show professional, legitimate knowledge of the software and its application.

Consider the peripheral systems of general ledger, purchasing, inventory and others that impact cash flow. How will you integrate these systems? Does the vendor offer techniques to ensure the logical flow of data through these systems? This may be the time to consider upgrading your other systems, too. Can the vendor offer support in that area?

The last pitfall to avoid is overanalyzing. Develop confidence in what you know. Find the vendor who offers the broadest based solution and make a commitment to your course of action. Delaying the buying decision will only cause your problem to worsen and the cost of the solution to increase.

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dress, as well as optional information on permanent factors, IRS form 1099, use tax indicators and so on. Establishment of vendors' standard terms, or set of terms, will simplify the processing of normal invoices.

On-line inquiry features should provide you with immediate access to the vendor data base and vendor history to answer vendor inquiries. Specific functions, such as the ability to place some or all payments to a vendor on hold, further increase the system's cash management value.

Administering the policies for cash disbursement is the most critical aspect of the system because it controls the organization's cash outflow. In establishing cash disbursement policies, the system should allow for a variety of accounts payable operating environments. They might involve multiple paying entities, cash vs. accrual accounting, varying fiscal calendars, processing dates and centralized vs. decentralized payables processing.

The objective of an automated cash disbursement system should be to let the computer handle as many decisions as possible. For example, a default hierarchy that covers the levels of company policy, vendor policy, batch, invoice and individual item processing should be available. These functions allow standard payment policies to be established at each level of an organization and to be overridden at lower levels as required. Additional features, including recurring payments, variable payments, standard holdbacks and prepayments should also be considered.

The system's ability to apply preestablished terms automatically is also important. Since the cash disbursement function results in a payment, provisions must also be available for automated clearinghouse processing and for the disbursement and automatic reconciliation of multiple bank accounts.

Through *reporting of current and projected cash obligations*, management gets an accurate picture of current and potential cash disbursements. Key information includes aged trial balances, item analyses for future payment cycles, cash requirements projections, invoice/vendor on hold, credit balance vendors and bank balance requirement registers.

Reports reflecting cash requirements are critical, since they enable management to optimize payment procedures, accelerate or slow down cash disbursement activity, manage bank accounts and change disbursement policies.

The accounts payable system should *establish accountability* over account distribution, which generates the accounting entries necessary to record all components of the disbursement process properly. Features that allow for automatic distribution at the necessary level of accounting detail are a must. This en-

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IN DEPTH

sures that accurate general ledger entries are made at the proper level of detail with a minimum of manual intervention.

This activity should allow for prior-period and future-period entries as well as automatic proration of certain expenses. An automated interface between the accounts payable and general ledger systems should include edited and balanced transactions. Other interface provisions to consider are your organization's needs for project, product or line-of-business accounting, as well as multiple currency and employee expense reimbursement.

Accounts Receivable

Of all the components of an integrated cash management system, accounts receivable can achieve the most significant cost savings because an accounts receivable system can accelerate the velocity of an organization's cash inflows.

The objectives of an automated accounts receivable system are to:

- Control credit risks.
- Accelerate collections.
- Provide for a timely cash application.

To control credit risks, an automated accounts receivable system should provide immediate on-line access to credit information on each account including payment habits, balance owed, amount of last payment, past-due status and current cash receipts.

To accelerate the collection process, the system provides credit personnel with immediate access to account information that has been pre-selected for review because of delinquent payments, approaching or exceeding credit limits and review dates. To provide timely cash application, the system should handle the three major methods of cash application: preidentified receipts, post-identified receipts and autocash.

Here are some of the components necessary to accomplish the objectives of an automated accounts receivable system:

- Exception handling.
- Dunning letters.
- Credit line.
- Payment trends.
- Cash application.
- Ease of maintenance.
- Subledger accounting.
- Management reports.
- Data security procedures.

Exception reporting and *exception handling* are important first components of an automated accounts receivable system. They solve a common problem in dealing with accounts receivable: too much data. Exception reporting provides the ability to report delinquent and "credit line exceeded" customers. It also meets the need to address specific items requiring attention on customer accounts.

The ability to inquire and follow up on customer information provides you with access to current customer status information, which should be outlined with general customer information clearly separated from account details. A system-monitored follow-up capability with provisions for subjective notes on a customer's account lets your credit and collection personnel spend more time with customers and less time researching and following up on information.

Dunning letters and finance charges can improve cash flow, too. You should be able to control their use on a customer-by-customer basis.

Credit line and credit interchange allow the use of assigned lines of credit to control credit risks. This means the system monitors credit lines while it allows the flexibility for temporary or permanent changes to credit lines to accommodate the changing position of specific customers. Many credit organizations relate the credit lines in a formal way to established standards of financial strength. A capability should exist to generate this type of data as well as to use information from organizations like Dunn & Bradstreet and TRW Corp. to control credit risk within the system.

The ability to track *payment trends* is the key to resolving credit risks. Ultimately controlled by an individual credit decision, credit risk must be based on assessments of current data and trends in the customer's payment habits. Only by comparing current with previous payment habits can you make a meaningful projection of future behavior. Inquiry and

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IN DEPTH

reporting features of the system should provide this capability.

For timely *cash application*, the system must allow receipts to be applied automatically from a lockbox tape or via a CRT terminal. This is an area where the user-friendly nature of an automated accounts receivable system is most apparent. Simple, user-oriented procedures help to avoid further complicating the critical task of matching invoices with payments and reconciling discrepancies. "Autocash" is the term commonly applied to the automated version of the function. The system should provide the necessary variety of automatic cash-application techniques necessary for your specific credit and collection pattern.

Ease of maintenance is critical to an accounts receivable system since all credit decisions relate to current customer data. Establishing, changing or deleting information about a customer should be a simple, on-line, real-time process.

Subledger accounting completes the accounting cycle. The system should be able to act as a subledger and automatically capture the appropriate accounting entries for posting to a general ledger control account. Subledger accounting should be all-inclusive, allowing for sales/revenue and adjusting entries as well as the typical cash and accounts receivable entries. If so, tedious reconciliation and adjustment is eliminated early in the accounting process. Adequate validation and editing ensures proper processing through the general ledger interface.

While standard *management reports*, such as journals and trial balances, are produced by most cash management systems, a receipts projection based on experience and current conditions is also mandatory. Flexible reporting is another necessity, since your reporting requirements will change in time. You also need an easy-to-use ad hoc reporting mechanism.

Data security procedures must protect the data captured in any component of a cash management system. Because accounts receivable tracks the detailed flow of money in an organization, this information must be guarded through proper data security procedures to prevent unauthorized access or changes. Adequate provisions must also be made for recovery of receivables data lost due to computer failure.

All of these components comprise a state-of-the-art credit management and accounts receivable system.

A Cash Plan

The first two components of an integrated cash management system — accounts payable and accounts receivable — can be used to present and mobilize a company's cash plan. By managing payables and receivables, an organization can control its inflow and outflow of cash. Preparing the cash plan is the final step necessary to achieve control over your corporation's cash management function.

To put the cash plan into effect, three functions are necessary:

- Consolidating information.
- Forecasting.
- Mobilization.

Consolidating information involves bringing together the cash-flow data from accounts payable, accounts receivable and other sources into an effective form for use. Forecasting involves using the specialized cash-planning tools available for analyzing and forecasting the cash-flow impact on an organization, its bank accounts and its balance sheet. Mobilization completes the cycle by acting on the consolidated cash plan that was compiled.

Whether the decision is to take steps to speed up cash collections, consolidate funds for better control, slow down the payment cycles or whatever makes most sense in your particular situation, the idea behind mobilization is action rather than reaction.

To forecast effectively and mobilize the cash plan, an integrated set of cash-planning tools is a necessity. The first requirement is implementation of a planning data base to consolidate the key items for forecasting and analysis. The planning data base should be automatically interfaced to the accounts payable and accounts receivable system (as shown in Fig-

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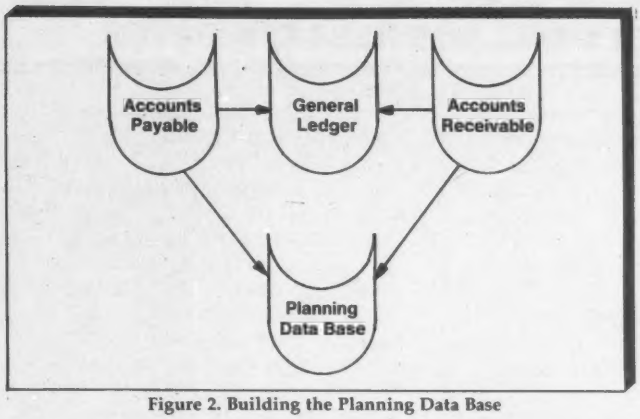

Figure 2. Building the Planning Data Base

ure 2). The general ledger system is an important source for additional financial information for most organizations.

Automated interfaces to other systems ensure that information is always available for instant access and timely analysis. Cash balances from general ledger, cash disbursement information from accounts payable and cash receipt and credit information from accounts receivable are the key items necessary for cash analysis and forecasting. Based on your requirements, you can incorporate other significant factors in the forecast.

After information is consolidated in the planning data base, the next step toward mobilization is to develop cash-flow planning models for your organization. These models are developed most easily using forecasting and planning software tools. Software for cash management modeling should include the following components:

- An English-like modeling language so that forecasts can be used easily by financial analysts.
- Forecasting statistical tools that relate to the cash management function.
- Interactive real-time access for "what-if" analysis.
- On-line reporting tools and color graphics for display of management information.

The primary benefit of modeling the cash plan is to provide management with the ability to simulate "what-if" assumptions and changes instantly (see Figure 3). An interac-

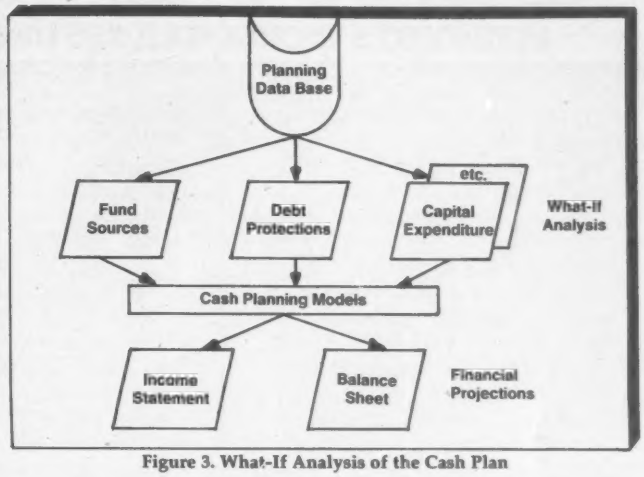

Figure 3. What-If Analysis of the Cash Plan

11

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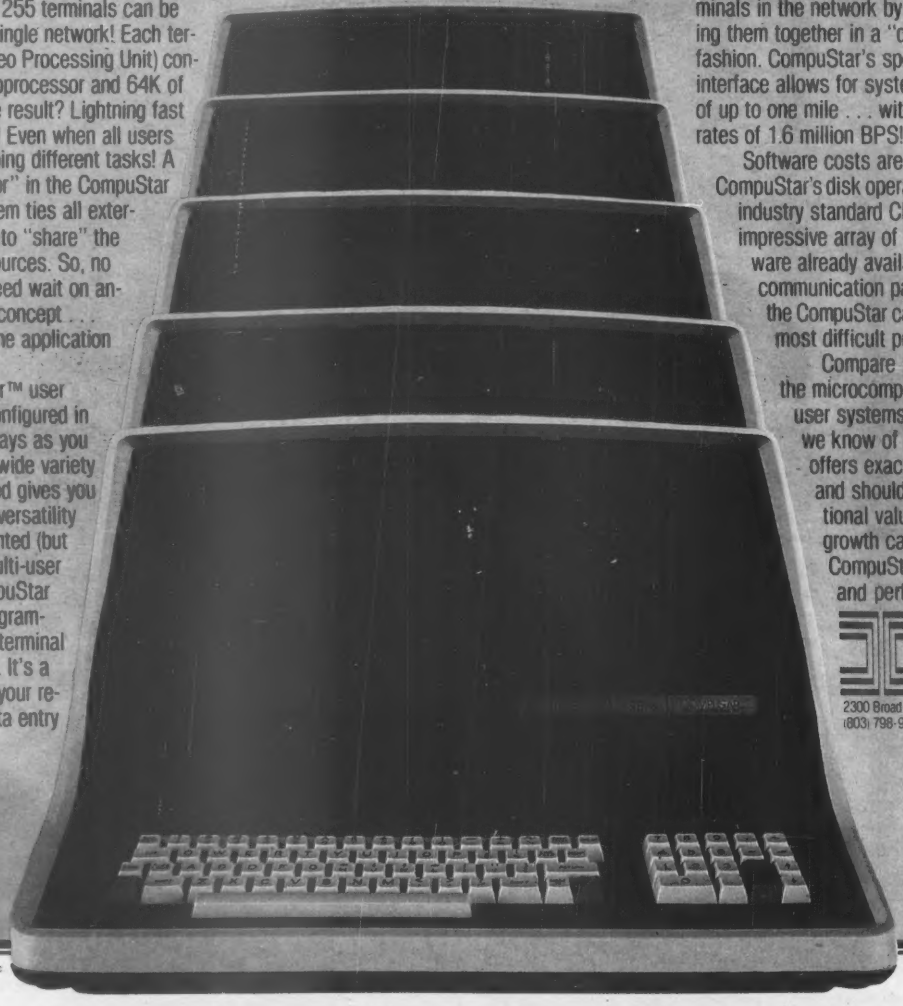

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tive software system allows you to ask such questions as, "What if payment terms change?", "What if collection policy changes?" and, the most common, "What if interest rates change?" The following types of reporting should be available to help you compile the cash plan:

- Sources and applications of funds.
- Projected cash balances.
- Debt projections.
- Maturity schedules.
- Investment portfolio analysis.
- Receivables aging.
- Receivables trends.
- Receivables vs. sales.
- Collection projections.
- Float analysis.
- Capital expenditure projections.
- Foreign currency exposure.

You can use all of these factors to project an income statement and a balance sheet. At this point, it is easy to see the results of a particular cash plan relative to its effect on the bottom line.

Applying the Plan

Armed with these tools, you are now ready to establish objectives for your cash management system based on the data you have collected. You are now ready to act on the consolidated cash plan you have compiled.

Here are some general guidelines for objectives:

- Minimize cash invested in non-earning assets.
- Control cost of capital.
- Reduce collection float to increase funds availability.
- Extend disbursement float to stretch short-term funds.
- Determine expected investment return from use of excess cash.
- Establish minimum cash balances necessary to support business activity levels.
- Clearly define payment policies that are sensitive to adjustment.
- Maintain overall fund-collection procedures.

You need to measure your performance against your objectives. For example, you can measure specific cash management functions in terms of dollar productivity or quality results. Some indicators you can use are collection float, disbursement float, cost of capital, return on invested excess cash, cash requirements per business activity level and day's receivables outstanding.

The key to success in mobilizing is the same as in any other management endeavor: The results must be

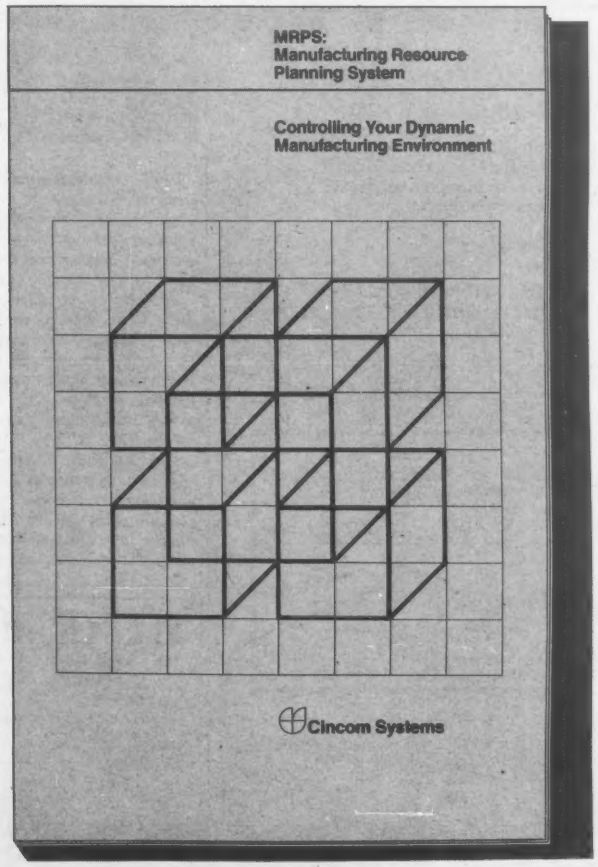
The Cash Management Horizon

With a broad range of issues facing the cash management community, it is difficult to predict specifically which ones will affect you most. Areas of concern range from your local bank's service policy to changes in foreign exchange rates. As a manager, your best course of action is to ensure that you have at least considered possible changes and the impact they might have on your organization before you embark on a long-term cash plan. For example:

- What is your expectation for your company's cost of capital? How might that be affected by changes in borrowing or investment decisions?
- What will be your company's position in acquiring funds through debt or equity financing? At what rates?
- What impact will electronic funds transfer have on your cash management techniques?
- What services can your bank provide in the area of cash management? Will the charge structure for these services be changing?
- Have you anticipated the evolution of alternate forms of payment in the U.S. such as those commonly found in the Common Market countries? How will this affect your cash disbursement and receipts processing? How will changes by the Federal Reserve affect float?
- Have you considered the impact of centralized disbursing activities and centralized credit/collection activities on your organization? What is the proper direction for you?

There is no insurance against the negative impact that changes such as these might have on your organization's cash flow. You can, however, have a well thought-out cash plan that is responsive to change.

The cash plan and associated cash management software give you that critical extra time you need to respond to these changing issues.



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IN DEPTH

measurable and capable of being compared against the goals established for your organization.

Using the tools of an automated accounts payable and accounts receivable system together with an effective corporate cash plan, your organization should be able to accelerate collections and produce adequate forecasts of cash disbursements. It should also be able to control the cash disbursement process and have an adequate forecast of the cash necessary to support varying levels of business activity.

You will have a current knowledge of your cash costs, knowledge of potential investment or borrowing alternatives and be able to mobilize funds effectively for the most profitable investment. If you are successful in managing these components of cash flow, then you will be able to make cash management less of a moving target for your organization.

After you have achieved that level of success, you can fine tune the cash management functions further. With an automated data base of information available, a continual review of the current pattern of receipts, disbursements, investments and borrowing will allow you to manage and react to future requirements better.

For firms of all sizes, effective cash management can lead to a significant reduction in the amount of working capital required to conduct business.

About the Author

Ray L. Dicasali is a vice-president at Management Science America, Inc., an application software firm that offers financial, cash management and human resource software systems.

Dicasali is responsible for MSA's Cash Management Systems Division. He has worked in the application software industry for more than 10 years and has been involved in the development and implementation of a broad range of financial and cash management systems.

Dicasali received his B.S. degree from the Georgia Institute of Technology and his MBA in finance from Florida State University.

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Managing the Maverick

A Three-Point Approach for DP Professionals

By Gary Slaughter

DP professionals have been described as loners, "a breed apart." How do you manage and motivate them? Part 1 of this three-part series showed the results of a recent study by University of Colorado professors J. Daniel Couger and Robert Zawacki, which proved statistically that DP professionals have the lowest social need strength (SNS) of 600 job categories surveyed. The author proposes a three-point management solution: Part 1 covered the problem of communication; Part 2 tackled motivation; and this week, Part 3 discusses effective DP management skills.

DP managers must face two realities. First, learning and teaching communication skills and removing barriers to motivation by implementing a comprehensive human resource management program will require a major commitment of time from DP managers at all levels.

Second, DP managers typically do not have the time to spend on these kinds of activities, because they are "too busy" managing DP — using the same outdated management skills on which they have always relied.

DP managers must understand that learning and using a new set of skills can save the time they need to concentrate on DP communications and motivation.

Following are some of the skills that make up a more effective DP management approach:

Part 3

IN DEPTH

1. Problem solving/decision making. DP professionals have a reputation for being organized and systematic. In the area of problem solving and decision making, however, DP managers often demonstrate just the opposite characteristics. The process of solving problems involves defining the problems, gathering data, identifying alternative solutions and developing an action plan that includes feedback and evaluation. DP managers can learn this process easily and apply it in their work.

2. Force-field analysis. This is a process for defining problems as distinguished from symptoms or a situation. Force-field analysis identifies both helping and hindering factors affecting any situation at any moment. Each factor then becomes a manageable problem that can be tackled systematically and efficiently. This approach works particularly well in the DP environment.

3. Conflict resolution. DP management time is often totally absorbed in resolving conflicts between people. A systematic approach to resolving conflicts using a "win-win" philosophy can be learned and applied in the DP environment.

4. Task analysis. This is a method of inventorying all tasks performed by the DP organization. The inventory process often uncovers major inefficiencies in the way work is organized. The task analysis, once complete, can be used to improve DP productivity through greatly improved job communication, career development effectiveness improvement and training.

5. Time management. DP managers complain about not having time to spend on managing people problems. However, they waste a good deal of their time. Recognizing the typical ways in which managers waste time and learning methods for organizing and using time more effectively will deliver big payoffs for behind-schedule DP managers.

6. Performance appraisal and counseling. DP managers do a less-than-satisfactory job in providing feedback to subordinates. They often view the performance appraisal and counseling as once-a-year events. In reality, to overcome the lack of communication in the DP environment, performance appraisal and counseling should take place every day. Learning how to appraise performance and counsel subordinates on an informal and ongoing basis will pay great dividends to DP managers.

7. Objective setting. In the dynamic work environment of DP, it is essential that managers keep a clear set of objectives in mind. If they are not clear on where they are headed, they often get off the track and end up somewhere else. Setting objectives is not an easy task for DP people. They are often more comfortable with the freedom of not having to plan their activities and time. Learning to set objectives and to follow a set of rules to ensure that you are always on track is an essential DP management tool.

8. Planning, scheduling and resource allocation. Once DP

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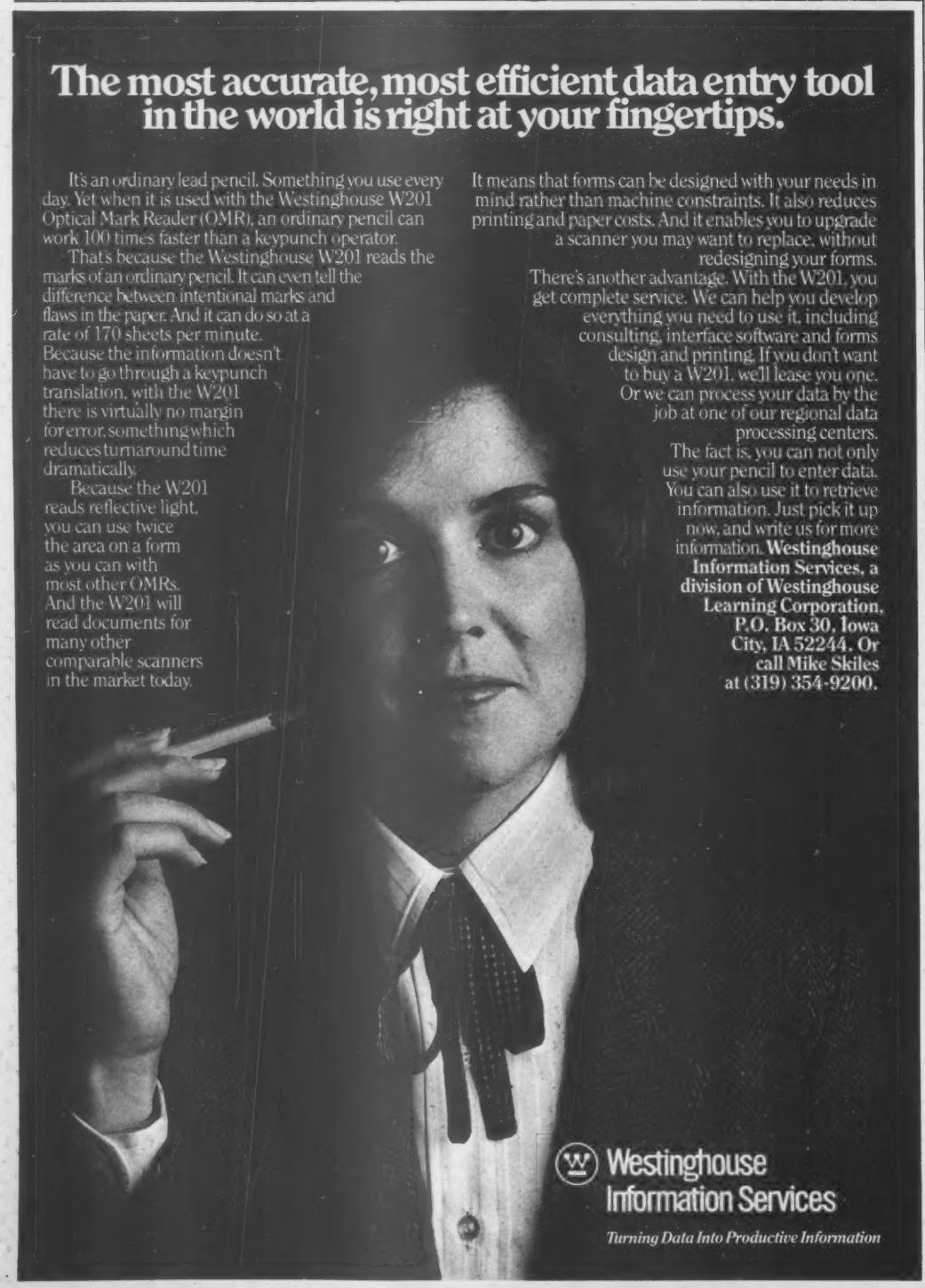

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managers have learned to set objectives, this skill can be translated into effective planning, scheduling and resource allocation. With the current backlog of systems development work that prevails in most DP organizations — and with the shortage of experienced people to do that work — these skills become critically important in dealing with both top management and users.

Like the other management skills in the new DP management approach, effective planning, scheduling and resource allocation can be learned and applied successfully in the DP work environment.

9. Budgeting. Proper management of the DP activity and all its facets translates into one final form, the DP budget. DP management's approach to the budgeting process will determine the parameters within which the department must work.

Solving the problems of communication and motivation will take time and effort. DP managers are too busy managing the day-to-day DP work environment to spend time on solving these problems. This cycle can only be broken if DP managers start to apply time-saving management tools. These tools are learned easily and may be put to immediate beneficial use.

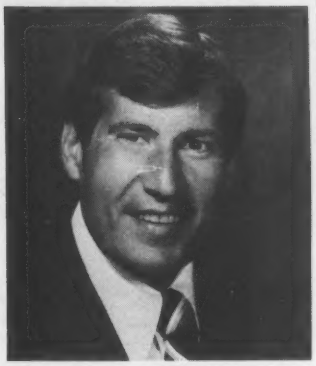
A New Approach

There is a critical need to apply a new management approach to the DP work environment if we hope to change the present condition of that environment in most DP organizations. This new approach should be made up of three groupings of skills to be learned by DP managers, supervisors and, in some cases, DP staff as well: communication skills, motivation barrier-removal skills and new DP management skills.

How and where are these skills best learned? The traditional sources are books, lectures, packages, consultants, professional associations and workshops. The author has a strong bias toward the adult learning workshop, which provides a safe environment for DP managers and supervisors to learn by doing. Only skills that are job-relevant should be taught in the adult learning workshop, and each of these skills must be reinforced by practice. These rules follow the tenets of effective adult learning.

Regardless of where or how the new DP management approach is learned, we see the three-point approach outlined in this series as the only hope for DP organizations sincerely interested in improving the productivity, profitability and work satisfaction of their employees.

About the Author



Gary Slaughter is president of Gary Slaughter Corp., a consulting firm based in Bethesda, Md. Prior to founding that company, Slaughter was president of Brandon Systems Institute (BSI) for six years, from 1974 to 1979. While BSI president, he introduced a number of services for the DP industry including consortium training and human resource management publications.

Slaughter's DP background includes systems development management, project management and systems analysis positions. He has also worked in the areas of project control and operations, scheduling and standards.

He teaches DP management development courses in communication, motivation, management skills, productivity improvement, problem solving, decision making and conflict resolution. In addition, he wrote the Data Processing Training Manual.

Slaughter spent several years as an officer in the Navy and graduated from the University of Michigan School of Business Administration.‡

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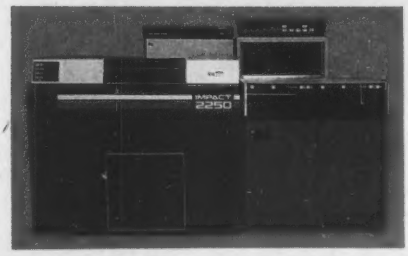

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Memory Cost Down

DG Enhances MV/8000, Triples Memory

WESTBORO, Mass. — Data General Corp.'s Information System Division has enhanced its 32-bit MV/8000 computer system by tripling the system's previous maximum main memory, reducing memory costs and adding intelligent asynchronous controllers that are said to boost I/O response time by up to 25%.

The firm also added to its band printer family by introducing a series of 600 line/min printers that feature a reduced number of mechanical parts.

DG expanded the memory of the MV/8000 by incorporating 64K-bit chips in the design of the system's memory boards. DG first used 64K-bit memory boards in its second 32-bit system, the MV/6000, which was introduced last September, the spokeswoman noted.

By taking advantage of the 64K-bit chips, the MV/8000 can have as many as 2M bytes of memory on a single board. Because of the reduction in slot space, the machine's new maximum memory is 12M bytes, a spokeswoman said.

At the same time, DG dropped its memory prices for its 32-bit systems line by up to 50%. Effective immediately, the cost per 1M-byte board is $16,000, down from $28,000, and the price of a 2M-byte board is reduced from $56,000 to $28,000.

The intelligent asynchronous controllers (IAC) now used in the MV/8000 were designed to enhance the I/O efficiency of such character-oriented devices as display and terminal printers. The IACs, which also debuted with the MV/6000, are said to improve response time by about 25%.

The IACs include a processor with 32K bytes of memory and various asynchronous line-control facilities. All of this is packaged on a 15-in. board, the spokeswoman said.

The IACs are available in two versions: an eight-line version for EIA connection under modem control and a 16-line model for direct EIA or 20 mA current loop interface connection. Both versions provide field character buffering, programmable line characteristics and support for 50 to 19.2 bit/sec line rates, the spokeswoman continued.

Both the memory and the IACs are supported by DG's 32-bit Advanced Operating System/Virtual Storage (AOS/VS), as well as the recently introduced AOS/real-time 32.

Prices for the revamped MV/8000 systems range from $182,950 for a system with 1M byte of memory, battery backup, a system console, one IAC, a 73M-byte disk drive and magnetic tape drive to $569,220 for a fully expanded 4M-byte system that includes three IACs, 65 terminals and nearly 900M bytes of disk storage.

DG's high-speed band printers include friction-free hammer actuators, low power consumption and a minimum of moving parts for cooler operation and increased reliability, the spokeswoman said. The printers feature either 64- or 96-char. print bands, a forms-length selector, a 12-channel direct-access vertical format unit, a forms receiver tray and a 30-ft I/O cable. The units print at 600 line/min on forms from 3- to 15-in. and can reportedly produce six readable copies.

The series includes the Models 4363, 4364, 4365 and 4366, which were designed to operate with the Eclipse computers, and the Models 9755, 9756, 9759 and 9760, which operate with DG's Commercial Systems family of small business computers.

Prices for the printers range from $12,900 to $13,300, the spokeswoman noted from 4400 Computer Drive, Westboro, Mass. 01580.

Telesis CAD/CAM Systems Feature Function Screen, Target Smaller Firms

CHELMSFORD, Mass. — Telesis Corp. has announced a series of computer-aided design and computer-aided manufacturing (CAD/CAM) systems that rely on user-friendly function screens and software to create designs rather than the conventional keyboard controls, data tablets and joy sticks.

Telesis' systems are aimed at smaller companies with revenues under $100 million that might need an automated design system, but cannot afford the more than $100,000 price tags of competing systems, according to a Telesis spokesman. The firm's systems start at $55,500.

The key feature of the Telesis product is its function screen, which is said to cut user training time down from months to days. Using the screen, operators select various systems functions from a menu to create and move diagrams and designs.

The system's Pascal-written graphics and data base management software assist the operator through every step of the design process, the spokesman claimed. Previously specified design parameters check and accelerate the work in progress.

The systems are initially aimed at the $600 million printed circuit board CAD market, but will be expanded to other areas in the future, the spokesman added.

Prices for the systems range from $55,500 for the black-and-white S100 model to $151,500 for the color T500 system.

Telesis is located at 21 Alpha Road, Chelmsford, Mass. 01824.

SIS Opens Third Disaster Backup Center

NORTHBROOK, Ill. — Sun Information Services Co. (SIS) has opened a third disaster recovery and backup center here for organizations with large-scale IBM equipment.

Like its two other centers in Philadelphia, the third backup facility — Sungard III — is designed to provide clients with the use of a complete IBM computer system within four hours notice of a disaster.

SIS' Sungard centers not only provide a computer system, but offer preconditioned computer rooms for installing replacement systems and equipment; office and terminal space; and on-site technical support for operations, software and telecommunications. The firm also is said to conduct periodic simulated disaster drills with clients and will test a user's programs to assure they will work well on the backup equipment should a disaster occur.

SIS disaster recovery centers currently support more than 150 Fortune 500 companies and banks across the country. Client fees are based on the level of backup required and the size of the client. The firm is a subsidiary of the Sun Co., headquartered in Radnor, Pa.

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Cavri Introduces Video Controller

NEW HAVEN, Conn. — A video controller said to allow users to write, edit and view programs that combine computer-assisted instruction or information management with videotaped or videodisk pictures and sound is available from Cavri Systems, Inc.

The Intermedia Universal Video Controller is RS-232-compatible and can perform operations independently of the host computer, the vendor said. Applications include training, point of sale, information storage and retrieval, broadcasting, process control using video and process control for nonvideo devices.

The unit costs $3,500 from 26 Trumbull St., New Haven, Conn. 06511.

Anvil 4000 Gains CRT Workstation

IRVINE, Calif. — Manufacturing and Consulting Services, Inc. (MCS) has announced a programmable, intelligent and interactive CRT display workstation for its Anvil 4000 computer-aided design and manufacturing software.

The Anvil 1200 intelligent interactive display (IID) reportedly includes a 1,024 pixel by 1,024 pixel monochromatic display, 320K bytes of random-access memory, a keyboard with joystick cursor control, alphanumeric overlay and an interactive tablet with stylus.

The system also includes a user-programmable Workplane overlay that breaks up the display into grids. The overlay reportedly allows the user to execute some Anvil software functions with the stylus rather than several keyboard keystrokes, a spokesman said.

The workstation also is said to feature buffered data entry, which transmits lines of data to the host computer in a single block, freeing the host computer from any interaction while data is being entered. In addition, entity picking can be done by the user from the terminal. This means that a user can select or delete entities from the screen without any interaction from the host machine, the spokesman explained.

The 1200 IID workstation is priced at $18,250 and a custom-designed workbench costs an additional $500, he added.

Additional information is available from the firm, located at 17942 Cowan Ave., Irvine, Calif. 92714.

CAD/CAM Gets Color Graphics

MOUNTAIN VIEW, Calif. — International Applied Systems, Inc. has announced a color graphics display for IBM computer-aided design and manufacturing (CAD/CAM) systems.

Called the Model 2100 CAD-Color-graphics System, the unit can be used in place of IBM's black and white calligraphic system — the 3250 Graphics Display System — the vendor said.

A typical configuration includes a 2121 on-line control unit, a 2140 remote-graphics controller, a 2160 graphics-display generator and a 2180 graphics-display station, the vendor said.

Systems are priced from $50,000, the vendor said from 175 E. Dana St., Mountain View, Calif. 94041.

Plotters Reproduce Reports in Color

AUSTIN, Texas — Two plotters designed to operate with Digital Equipment Corp.'s Regis graphics language have been released by the Instruments & Systems Division of Bausch & Lomb, Inc.

The Hiplot/Regis Models DMP-4R and DMP-7R can graphically reproduce reports in color and feature push-button controls, a .005-in. resolution, a 2.8 in./sec speed and a dual-port RS-232C interface.

The DMP-4R produces 8½- by 11-in. graphics in up to six colors. The DMP-7R is capable of 11- by 17-in. graphics in up to eight colors. The products are priced at $2,380 and $3,180, respectively, according to the vendor at P.O. Box 15720, Austin, Texas 78761.

START TO FINISH COVERAGE OF NCC AND EVERYTHING IN BETWEEN

We start with our May 31st National Computer Conference Preview Issue. Everything you need to know about the show before it's happened. We'll include the sessions, tell you who's speaking, review the exhibitors and what they'll be exhibiting. Extra issues will be distributed at the *Computerworld* booth at NCC. Black and white ad close is May 21st. Color close is May 14th.

Then our NCC Show Issue comes out June 7th, the day of the show. It will have last-minute show information, speech previews and other show details. Pick up a copy at the *Computerworld* booth. Black and white ad close is May 27th*. Color close is May 21st.

Finally, our June 14th NCC Wrap-Up Issue will have complete coverage of all that happened, prepared by our 35-person editorial staff. You'll read who said what, who introduced what and how it works, and review the show's features and highlights in words and pictures. Black and white ad close is June 4th. Color close is May 28th.

Contact your *Computerworld* representative for complete ad details for any or all of these Special Issues. Or, to reserve ad space, call Frank Collins at (617) 879-0700.

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Designed Around Unix

Plexus Unveils 16-Bit Multiprocessor Mini

SANTA CLARA, Calif. — A 16-bit multiprocessor minicomputer, which was designed around Bell Laboratories' Unix operating system and is said to equal the performance of a Digital Equipment Corp. PDP-11/70 processor, has been introduced by Plexus Computers, Inc.

Plexus P/25 is a compact, tabletop system that can reportedly support up to 16 users and offers up to 2M bytes of memory. The maximum memory can be configured on two plug-in boards and has a cycle time of 600 nsec, including error detection and correction.

The P/25 is the second Unix-based system introduced by the firm, which was founded in 1980. The first system, the P/40, is compatible with the latest entry, but can support up to 24 users, a spokesman said.

A key element of the P/25 is said to be its multiprocessor design, which reportedly links the system's main job processor with up to two 16-bit I/O processors and an intelligent mass-storage controller.

The intelligent communications processors (ICP) relieve the main processor of certain I/O tasks, reportedly allowing the CPU to take more advantage of Unix high-throughput capabilities. The ICPs each have eight RS-232C-compatible serial ports. The ports support asynchronous or bisynchronous protocols at software-selectable rates up to 19.2K bit/sec, the vendor said. Each ICP also has 32K bytes of random-access memory, 16K bytes of programmable read-only memory, a parallel port and nine direct-memory access channels, the spokesman added.

The intelligent mass-storage controller has 128K bytes of memory and handles the P/25's Winchester disk drive and streaming cartridge tape drive. In addition to performing error-checking and correcting functions, the controller is said to perform diagnostics automatically, using a reserved disk track, and will complete disk transfers in the event of a power failure, the spokesman noted. The 16-bit controller is programmed by Plexus in the high-level C language.

The P/25 can accommodate up to 288M bytes of formatted disk storage, using 22M-, 36M- or 72M-byte disk drives. The 72M-byte drive features an average data access time of 28 msec while the smaller capacity drives have an access time of 38 msec. Each of the devices has a data transfer rate of 1.2M byte/sec, the spokesman pointed out.

The system's streaming tape drive is an 8,000 bit/in. device and is geared for data backup. The drive stores 20M bytes of data on a 3M Corp.-type cassette.

Like the flagship P/40, the P/25 adheres to a number of industry standards to facilitate program-for-program compatibility among systems. For instance, the system incorporates industry-standard interfaces for its disks, tapes, terminals and printers; has an IEEE 796 Intel Corp. Multibus I/O bus; uses a variety of industry-standard programming languages, such as C, Cobol, Digital Research, Inc.'s C Basic-16 and Mumps; uses Bell Laboratories' Unix Version 7 operating system; and adheres to industry-standard communications protocols, the spokesman noted.

The P/25 is available in a variety of configurations. A typical system, consisting of the job processor with 1M byte of memory, 72M bytes of disk storage and two ICPs to handle 16 user ports, has a Unix license fee of $40,000. However, an eight-user system with 512K bytes of memory, 36M bytes of disk storage and one ICP is priced at $27,000.

Additional information on the system can be obtained from Plexus at 2230 Martin Ave., Santa Clara, Calif. 95050.

DEC Unibus Users Get 1M-Byte RAM

SANTA CLARA, Calif. — A 1M-byte random-access memory (RAM) board designed to be compatible with the Digital Equipment Corp. PDP-11 and its Unibus family of computers has been unveiled by National Semiconductor Corp.

The NS11U memory card utilizes 64K-bit chip technology and can be configured from 32K- to 512K bytes of memory. This means, for instance, that a PDP-11/44 with four available slots can address up to 4M bytes of memory with the NS11U, the vendor said.

The NS11U is compatible with 22-bit extended-memory addressing, incorporates socketed RAMs with a pretested on-board spare, has an address range selection made up of 16K-byte boundaries within the address field, has single-voltage-only operation, features a battery backup compatibility option and has standard on-board refresh with optional external refresh, a spokesman said.

It can be operated with, or in place of, the DEC Model MS11-FP, MS11-JP, MS11-L and MS11-M memories and is compatible with any of the following backplanes: DD11-CK, DD11-DK, DD11-PK, DD11-CF, DD11-DF and DD11-PF, the vendor said.

The list price for the NS11U is $3,463 for each 1M-byte board and $2,282 for the 512K-byte board.

National Semiconductor is headquartered at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Minibits

Peripheral Controller Provides Up to 128K Characters of Data

NORCROSS, Ga. — An intelligent peripheral controller that reportedly provides up to 128K characters of data and printer sharing is available from Quadram Corp.

The Interfazer can reportedly accept printer output from one to eight computers. The unit is controlled with an 8085 microprocessor and contains 10 slots for interface cards or memory expansion, the vendor said.

Using an RS-232C-type interface, the device then buffers data and steers it to the designated printer or other device without physical switching, according to the vendor.

Parallel or serial output devices can be connected to the controller. The system's data rate does not need to match the output rate, the vendor said.

Interfazer will also function as an incompatible device interface, computer-interface card expander, data transfer rate converter or as an additional peripheral buffer and multiplexer, the vendor continued.

Prices for the Interfazer begin at $350 for the base unit. Additional costs include $350 for each 64K bytes of memory, $85 for parallel input cards and $95 for serial cards.

Quadram is located at 4357 Park Drive, Norcross, Ga. 30093.

Microprocessor-Based Desktop Offers 64K Bytes of Memory

MOONACHIE, N.J. — Sanyo Business Systems Corp. has introduced a microprocessor-based desktop computer that features 64K bytes of memory, a detachable keyboard and a graphics capability.

The MBC-1000 utilizes an eight-bit Z80A microprocessor and runs under Digital Research, Inc.'s CP/M operating system. Other software includes Sanyo's Basic and Diagnostics and Utilities packages.

The system has a high-impact green-phosphor CRT display screen, a detachable keyboard with number pad, cursor control keys and five programmable function keys. It also has a 5¼-in. double-sided double-density disk drive with a three-disk add-on capacity or two 8-in. disk drives for a total of 2.3M bytes of additional disk storage, according to the vendor spokesman.

The MBC-1000 not only supports CP/M-compatible software, but also can run programs in C Basic, M Basic, Fortran, Cobol and Forth.

The system costs about $1,995 from Sanyo, 51 Joseph St., Moonachie, N.J. 07074.

Power-Failure Clock Module Released for LSI-11 Systems

ORANGE, Calif. — MDB Systems, Inc. has announced a power-failure detector/line time clock module for Digital Equipment Corp. LSI-11 systems.

The MLSI-KPV11 unit detects ac input voltage and dc levels on the power supply. It can be used to replace the DEC KPV11-A, the KPV11-B or KPV11 modules, the vendor said.

The unit costs $335.

The vendor is located at 1995 N. Batavia St., Orange, Calif. 92665.

Commodore Users Get Adapter For Output to Epson Printers

BROOKFIELD, Conn. — A printer adapter that reportedly allows users of Commodore Business Machines, Inc. personal computers to output to Epson America, Inc. MX-70 printers has been introduced by Connecticut Microcomputer, Inc.

The Adax70 supports uppercase and lowercase letters as well as Epson MX-70 graphics. It comes with a 2-ft cable that plugs into Commodore's Personal Electronic Transactor (PET) IEEE port. A second IEEE card-edge connector is also provided for connecting disks and other peripherals to PET.

The unit is said to work with Professional Software, Inc.'s Wordpro software and Visicorp's Visicalc. The unit derives power from the printer or an external power supply, the vendor said.

Adax70 comes completely assembled and tested, with case and cables and is priced at $129, according to the vendor.

The vendor is located at 36 Del Mar Drive, Brookfield, Conn. 06804.

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HP Introduces Electronic Mail For HP 3000

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced an electronic mail package for its HP 3000 system, which reportedly exchanges HP 3000 system files, messages, documents, business charts and graphs both locally and remotely.

HPMail is billed as a component of the HP 3000 "Interactive Office" and runs concurrently with other DP and office information processing activities, according to the vendor.

It operates from any terminal that can be connected to an HP 3000, including the HP 2382A office terminal, the HP 125 personal office computer and other HP terminals and desktop computers with data communications links to the HP 3000, according to the vendor.

A store-and-forward feature facilitates transmission through the nodes of a multiple-system network, providing paths through dial-up, leased, direct-connect or public data network (X.25 and X.21) lines.

Users reportedly need only specify the name of the recipient. If the sender requests acknowledgement, it is automatically sent when the message is read. A general delivery capability is said to provide the means to route messages to locations where they can be distributed manually.

Other features include:

- A work area, which provides for composing and editing longer communications and for assembling packages of information files, including graphics.
- A file cabinet, which stores messages and documents.
- A distribution directory, which provides the ability to construct, use and store standard distribution lists.

The administration area reportedly lets users tailor the HPMail environment with passwords, auto-forward instructions and auto-answer messages and the choice of an alternate to handle mail on the user's behalf.

The package uses an HP 3000 Image data base for document storage and local distribution. Documents are said to be stored once on each system in a network, with pointers for each intended recipient.

HPMail costs $10,000 and the right to copy software is $7,000 in the U.S., HP said from 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Data Entering, Reentering Termed Major Impediment to Office Productivity

By Bruce Hoard
CW Staff

DALLAS — The entering and reentering of data is one of the biggest impediments to increased office automation productivity, Einar Stefferud, president of Network Management Associates, Inc., said at the Interface '82 conference here recently.

A typical document may be rekeyed up to five or six times, Stefferud said, "and we aren't getting anywhere."

He suggested that one way to solve that problem is to spend more money on more sophisticated systems able to manage a message throughout its life cycle. And the way to do that, he said, is by following the example of factories that put expensive capital equipment at the disposal of workers.

Now is a particularly good time to invest in office automation equipment because of the plummeting cost of micrologic, which Stefferud claimed is decreasing by a factor of 100 every 10 years and has been doing so since 1940. By comparison, communications costs have been decreasing by a factor of 10 each decade, as have the costs of executing a line of software code. During the same period, the cost of paying people has been going up 6% yearly, he added.

The decreasing expense of micrologic means it will be readily available to nearly everyone, files can be located anywhere and computer-communications trade-offs will be less and less attractive because users will be able to establish processing capabilities at remote sites, according to Stefferud. However, he warned his audience against turning away from the use of the installed base of equipment to perform today's tasks. Each day, new applications are becoming cost-effective with the equipment on hand, he observed, adding that despite claims to the contrary, current management information systems have frequently made data harder, rather than easier, to access.

Stefferud maintained that office workers need interaction more than "quiet time." "It's in the process of interaction that they do their work," he pointed out.

He also said office automation systems will not all be cut from the same mold. "We have to cater to the fact that all people are going to want it a little differently," he said.

Critical office activities include one-on-one correspondence between two people, meetings, conferences and fact gathering and analysis. It is in the last area, fact gathering and analysis, that we are most proficient, he said. As examples of that success, he listed payroll and inventory control systems.

Office tools available include origination and modification, data capture and organizing, packaging and delivery, "personal" filing and retrieval and "institutional" data banking and retrieval. Stefferud differentiated between personal and institutional by explaining a bank customer would not ask a bank to balance his checking account from information stored in its own data base when he can utilize his own data to perform the task.

It is in the areas of personal and institutional filing and retrieval where there has been the most progress, he said.

Wang Unveils Laser Printer

LOWELL, Mass. — Wang Laboratories, Inc. has unveiled a laser printing system designed to act as a shared office automation resource that can handle multiple originals of multipage documents.

The Model LPS-12 works as an on-line output device for the vendor's Office Information Systems, Alliance systems and Virtual Storage systems with word processing capability.

The unit is said to operate at an average speed of 12 page/min with print resolution of 300 by 300 dot/in. It stores multiple character sets on the associated system disk and can support single and double underscore, slash overstrike, subscripts, superscripts and vertical expanded print.

To print a document, the operator specifies the fonts by selecting from the workstation's print menu. Depending on the fonts loaded, the operator reportedly has the flexibility of selecting 10-pitch, 12-pitch, 15-pitch or proportionally spaced printing in portrait or landscape format. A maximum of two font/page of output can be accessed, the vendor said.

The laser printer costs $27,995 and its monthly maintenance fee is $350, which includes 5,000 pages monthly. Above 5,000 pages, there is a 1.5 cent usage charge/page, Wang said from One Industrial Ave., Lowell, Mass. 01851.

Show Highlights 'Human Connection'

SAN FRANCISCO — The office automation conference opening here today and running through Wednesday has taken *The Human Connection* as its theme, but there will also be plenty of time and space devoted to state-of-the-art office automation hardware.

Sponsored by the American Federation of Information Processing Societies, Inc. (Afips), the show features exhibits from more than 125 vendors and a technical program consisting of 45 sessions and industry workshops.

Kicking things off, the first session today, "The Major Issues in Perspective," replaces the traditional keynote address. It will focus on factors related to individual acceptance and use of office systems; organizational effects of office systems; user interface and usability for "connecting" users to technologies; computer and communications technologies; and integration of the various technologies.

Exhibit hours for Monday and Tuesday are 10 a.m. to 6 p.m. On Wednesday, the hours are from 10 a.m. to 4 p.m.

WP Package Runs On DEC Systems

PASADENA, Calif. — Version 4 of Compu-Tome, Inc.'s CT*OS word processing software package reportedly runs under a variety of Digital Equipment Corp. operating systems, plus one of its own, for single-terminal use.

The systems include Digital Equipment Corp.'s RSTS/E, RSX-11M and VAX/VMS. It is said to be operable on DEC LSI-11, PDP-11 and VAX systems.

Written entirely in Macro-11 machine language for efficiency of memory usage and processing speed, CT*OS is said to present a minimal overhead load for simultaneous WP/DP operations, both in single- and multiple-station (up to 90) configurations. For example, a single-station system requires 56K bytes of memory.

Both DEC VT52 and VT100 intelligent terminals, as well as those from the following vendors, are supported, according to the vendor: Diablo Systems, Inc.; NEC Information Systems, Inc.; Qume Corp. and Sanders Associates, Inc.

The menu-driven CT*OS is said to be easily learnable by non-DP personnel. Functions include global search and replace, cut and paste files, list processing, Ascii file handling, 132-col document width and stored-text libraries.

Pricing for its own operating system for single-terminal use is $2,200 (single CPU license) with RSTS/E and RSX-11 versions priced at $3,600 and VAX versions available for $4,200, Compu-Tome said from 234 E. Colorado Blvd., Pasadena, Calif. 91101.

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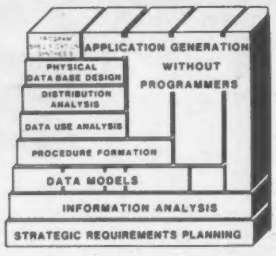

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ORIGINATORS OF THE INFORMATION ENGINEERING METHODOLOGIES

Menu-Driven WP Package Fits Nova, Emulating CPUs

TUSTIN, Calif. — A word processing package for users of Data General Corp.'s Nova-compatible operating systems is available from Dynamic Concepts, Inc.

Sentex was created for Dynamic Concept's Basic Interactive Timesharing System (Bits) and runs on any DG Nova, Eclipse or emulating computer. The menu-driven software features full text-editing capabilities, modify and print routines and allows access to a mailing list package.

The software displays a full index of documents on request and a test file check routine ensures that only the most recent version of a document is preserved in the systems' files.

Documents in these files may be copied, deleted, amended, formatted or printed. Files also may be added from, or dumped into, other parts of the system for the editing of reports produced by other programs.

The Sentex package, including user manuals on disk, is available immediately at $2,000, from Dynamic Concepts at 14712 Franklin Ave. F, Tustin, Calif. 92680.

WP System Gets, Compiles Data

CHARLESTON, S.C. — An extended word processing system with data base interfaces, work-sheet capabilities and expanded printer controls is available from Data Access Management Service.

Text-Master II reportedly allows information to be retrieved from data base files and included in the documents being printed, according to the vendor.

Information can be retrieved from several files and compiled into a single document. The system will perform several mathematical functions on the data and generate new values for printing, a spokesman for the vendor claimed.

The system was designed for the MIA/COM OSI Challenger series computers and operates under OS-65U Versions 1.2 or 1.3. It is fully Level 1- and Level 3-compatible and operates on both floppy and hard-disk systems, according to a spokesman for the vendor.

Text-Master II costs $500 from Data Access Management Service at 3320 Rivers Ave., Charleston, S.C. 29405.

Transceivers Run on Group 3

FAIRFIELD, N.J. — Rapicom, Inc. has unveiled a pair of desktop digital facsimile transceivers that reportedly feature the CCITT Group 3 compatibility and subminute document transmission speed.

The Models 3300 and 3100 also offer optional Group 2 compatibility for communications with slow-speed analog facsimile and 9,600 bit/sec step-down modem accessory, which reduces standard document throughput time from 45 sec to 30 sec, a spokesman for the company claimed.

Other common features of the two models, according to the vendor, include an automatic paper-cut mechanism that sizes incoming material to the length of the original document, separate counters that monitor the number of transmitted and received documents and automatic reduction capability when receiving from select Rapicom digital facsimile products.

The Model 3300 can be purchased for $6,000 or rented for $184/mo over a three-year term, a company spokesman said.

The Model 3100 sells for $5,580 and rents for $169/mo over a three-year term, Rapicom said from 7 Kingsbridge Road, Fairfield, N.J. 07006.

Device Logs All Phone Calls

SANTA CLARA, Calif. — Sycon, Inc. has introduced a hardware/software product that provides complete logging of pertinent data on outgoing and incoming telephone calls. The Phone Chronicle runs on both Apple Computer, Inc.'s Apple II and the IBM Personal Computer.

The device logs date, time, number called, duration and identification code and consists of a plug-in printed-circuit board, a complete software package, cables and a user manual, the vendor said.

The Phone Chronicle is powered independently of the computer and operates even when the computer is turned off or when being used for other tasks. It has its own microprocessor and a memory that is used to buffer the call data and has a battery pack to prevent loss of data during a power failure, the vendor said.

The on-board memory holds data from 150 calls. The software package handles four functions: data collection and transfer from the on-board memory to a diskette, initialization program, system editor for preparing report formulas and a report generator.

The price of Phone Chronicle is $395 for the single-line unit and $695 for the four-line module from Sycon, Inc., 3040 Scott Blvd., Santa Clara, Calif. 95050.

Disk Drive Fits Xerox Model 820

SANTA CLARA, Calif. — Rair Computer Corp. has announced a 5¼-in. Winchester disk drive for the Xerox Corp. Model 820 Personal Computer.

The Model 505, 5M-byte (formatted) disk drive is said to provide more than 20 times the storage capacity of the standard Xerox 820 floppy disk drive. Loading and retrieval speeds are increased by a factor of 10 and average random-access time is as low as 95 msec, a spokesman for the company claimed.

With host adaptor and Digital Research, Inc. CP/M software driver, the unit costs $3,500 from 4101 Burton Drive, Santa Clara, Calif. 95050.

Analyst Sees Big Winners, Losers in '80s

By Jake Kirchner
CW Washington Bureau

MIAMI — The decade of the 1980s will see widespread change in the computer industry, according to a Wall Street analyst who claims there will be some unexpected "big winners" and some equally surprising "big losers" from among today's computer makers.

"This industry really is never going to be the same again," Stephen T. McClellan, Salomon Brothers, Inc. vice-president, said here recently. "Not everyone's going to be a winner simply because you're in this business," McClellan told the Computer and Business Equipment Manufacturers Association (Cbema) at its gathering here two weeks ago.

Noting the industry is now in a transitional phase, McClellan stated that some companies are not aware of the changes taking place and are losing their market shares to aggressive newcomers. "It also seems that there is no in between," he said. Companies are "either gaining market share and really coming on strong" or they are "losing ground," according to McClellan, who said it is easier to start anew in a different market than to recapture market share once lost.

"Who's going to end up in the win column and who's going to end up in the lose column . . . is going to be surprising," he said (See table this page).

The short-term outlook for the industry is not particularly secure either, McClellan said, pronouncing himself "very concerned and quite worried" about the effects of a stagnating economy. "People thought last year was rough, and this year is going to be tougher," he predicted, saying a number of companies have been "holding their breath" waiting for an economic turnaround that might not come as soon as is hoped.

Noting a relatively new "economic sensitivity of this industry," he attributed it to the "incredible" penetration of computers into all sectors of society. It is no wonder, he said, that the widespread economic malaise is hurting the industry, which in years past had been more likely to weather hard times successfully than other American industries.

As for the long-term outlook, McClellan discussed several factors he said will determine the future winners and losers of

(Continued on Page 75)

AT&T, 'Japan, Inc.' To Score

MIAMI — AT&T and the combination of Japanese high-technology companies often referred to as "Japan, Inc." will be counted among the top 10 computer firms by the end of the decade, but just barely, according to Wall Street analyst Stephen T. McClellan.

While he expects those two entities to move into the upper ranks of the computer industry eventually, McClellan said it will take some time for their real competitive impact to be felt.

"I see AT&T taking five to 10 years to get its act togeth-

(Continued on Page 74)

1990's* Top 10

1. IBM
2. Digital Equipment Corp.
3. Storage Technology Corp.
4. Wang Laboratories, Inc.
5. Hewlett-Packard Co.
6. Control Data Corp.
7. Burroughs Corp.
8. Electronic Data Systems Corp.
9. AT&T
10. Japan Inc.

*Top 10 computer companies as predicted for 1990 by Salomon Brothers Inc.

Datapoint to Close Plant

SAN ANTONIO, Texas — As part of a cost reduction effort, Datapoint Corp. will shut down its plant in Waco, Texas; trim programs at its Berkeley, Calif., development center; and impose an indefinite across-the-board wage freeze.

The net reduction in work force will be 230 employees, the firm said. The manufacturing activities of the Waco plant, which makes the firm's small computers and 8220 terminals, will be transferred to the company's Fort Worth, Texas, plant at the end of April. An unspecified number of the 350 employees in the Waco plant will be offered transfers to the Fort Worth plant. If these employees decline transfers, the firm said it will hire new personnel at the Fort Worth plant.

Included in the work force reduction plan are some 150 employees at the corporation's headquarters here. In addition to the changes in Texas, Datapoint is scaling back its software development center in Berkeley, trimming its staff there from 40 to 20 employees.

"We are taking these actions to reduce operating costs and to adjust production volumes to match inventories with shipment expectations," Harold E. O'Kelley, chairman and chief executive officer, said. O'Kelley recently relinquished his position as company president, naming Edward P. Gistaro — formerly executive vice-president — as president and chief operating officer. O'Kelley added that the economic conditions "affecting the industry are, in my opinion, temporary."

In other changes, Datapoint named Daniel Hosage to the newly created position of executive vice-president of international operations.

Danger in Industry Seen

By Jake Kirchner
CW Washington Bureau

MIAMI — The computer industry is dangerously unprepared for its imminent transformation from a supplier of business products to a provider of consumer products, a Sperry Univac executive warned here recently.

"Ours is the only major industry in recent times making this transition from supplier to institutions to supplier to individuals," H. Glen Haney, Univac vice-president for strategic planning and development, said in an address here. This change is accompanying tremendous growth, according to Haney, who added, "We are a powerful industry on the threshold of an order of magnitude increment."

Haney, chairman of the Computer and Business Equipment Manufacturers Association (Cbema) told the association that the proliferation of personal computers and executive workstations is quickly changing the role of the computer industry.

"Most people do not perceive [that] they are in the midst of this revolution," said Haney, who added that "the dimensions of this industry far exceed the mainframe business." He

(Continued on Page 77)

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AT&T, 'Japan, Inc.' Moving Into Top 10: Analyst

(Continued from Page 73)

er," McClellan told executives attending a meeting of the Computer and Business Equipment Manufacturers Association here recently. "I see their role as not that major or not all that competitive" in the coming five years, he said.

AT&T has some tremendous advantages now — financial strength and a large customer base, for example — but he predicted it will take several years for AT&T to develop the marketing strength it will need to take on the established computer makers in their markets.

Many of the difficulties AT&T will have to overcome also are slowing Japanese firms' penetration of U.S. computer markets, according to McClellan, who said he does not see Japan, Inc. as a big threat any time soon.

Japanese firms have nothing approaching the marketing, software, services and maintenance capabilities of the entrenched U.S. suppliers, he noted. He predicted the Japanese in the next few years will concentrate on certain commodity areas, such as printers, low-end floppy disks and personal computers, where they can bring to bear their manufacturing expertise and economies without having to worry about maintenance and services.

It was suggested by some attending the meeting that the Japanese might make a bigger splash in U.S. markets sooner than McClellan expects if they can consummate additional and larger acquisitions of U.S. companies.

McClellan replied, however, that the Japanese "have never made a big acquisition over here and that may not work for them. History is replete with big takeovers and acquisitions that ended in disaster," he said.

TDI Builds Info Center

CINCINNATI — A one-stop center designed to assist businesses in acquiring information processing systems is being built by Transcontinental Development, Inc. (TDI).

Through its Cincinnati System Center and service arm, Systems Decisions International, Inc. (SDI), TDI — a residential and commercial development firm — will provide sales offices and consultant services to users seeking assistance on tailoring a system to their requirements.

The center and SDI are the result of three years of research into marketing procedures for TDI by the Data Processing Management Association and the Stanford Research Institute International.

Small and medium-size business managers were seen having trouble evaluating their own computer needs and choosing the right system mix from available products.

"It's like any other product," according to Dr. Daniel Miskie, vice-president of TDI. "You're bombarded with information from all sides."

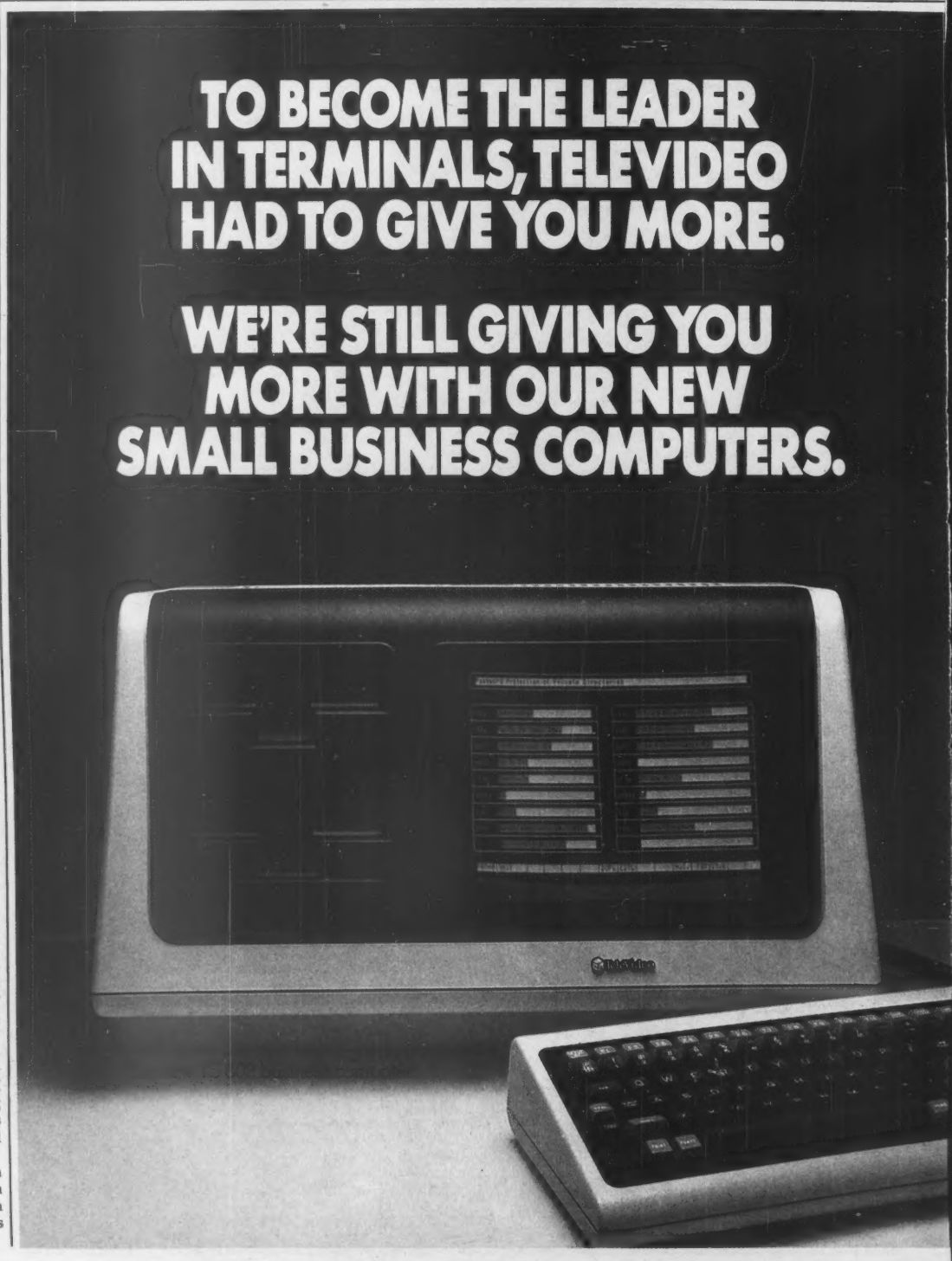
The center and SDI will serve as an information resource for potential buyers. Moreover, eventually about 40 vendor sales offices will be located in the 350,000 sq-ft center. Negotiations with specific vendors are ongoing, according to a TDI spokesman.

Buyers will have the option of negotiating directly with the vendor, choosing a systems mix from the offices at the center or using TDI's consultant services, the spokesman explained.

SDI staffers will examine the buyer's needs and analyze what system or system mix best suits those needs, suggesting to the buyer a range of choices. The buyer pays a fee to TDI based on the amount of work done by SDI and the center.

The center does not purchase the system, a TDI spokesman said, stressing the purchase negotiations are between the buyer and the manufacturer.

The center is slated to open in late 1983 or early 1984 in downtown Cincinnati, with branches in other locations to follow.



Analyst Cites Widespread Industry Changes

(Continued from Page 73)

the computer industry.

• Specialization — There has been a "tremendous fragmentation" in computer markets in the last few years, he said, noting the success of companies that are specializing, for example: Digital Equipment Corp. in minicomputers, Wang Laboratories, Inc. in word processing, Electronic Data Systems in DP services and Datapoint Corp. in distributed data processing.

Small specialized firms, "aggressive in [research and development] R&D, aggressive in management style and aggressive in marketing," are becoming more successful, he noted. He also noted that because of increased customer sophistication, companies are finding users more comfortable in mixing suppliers, which opens the door for specialists.

"The big generalists have tremendous strengths, and if they're fully utilized they can do tremendously well," he added. Large, established computer makers have software, marketing skill, large customer bases and considerable financial strength, he pointed out. He said those companies "really need to get bold and creative" to counter the challenge of the specialists.

• Size — "Smallness is now an advantage," according to McClellan, who defined small as about $1 billion in annual sales. These firms can enter markets faster, take more risks, have shorter R&D cycles and are not inhibited in product development by worries of disturbing large rental bases.

Small companies also can attract extremely qualified people because of better stock incentives and because they are generally better to work for, providing an exciting environment in which employees gain more responsibility, authority and have more of a direct impact on the company's future than they would in a large corporation, he said.

• Unique or proprietary products — The market is fragmenting into many smaller markets for various applications, such as insurance, banking, airlines and retail. Customers want specialized machines for their needs, he said. Companies that can develop products for and market to these diverse customer sectors will have an advantage over the general computer makers.

• Communications and Systems are displaying standalones. "You're going to be out in the cold," McClellan told the Cbema members, "unless your company's products can be integrated into the many types of networks that will spring up during this decade."

• Software and services — The demand here is going far faster than that for hardware, he said; the growth for services is now 21% annually and 28% for software. The increases of these two sectors within individual companies have been even greater in many cases, he added. Xerox, for example, saw a 75% growth here in 1979-1981; IBM, 28%; Wang Laboratories, Inc., 68%; and DEC, 38%.

Companies that are strong in this area will also fend off competition better, according to McClellan, who noted it is much more difficult to duplicate services and software than hardware. Services and software are "a very effective barrier to entry and a tremendous advantage to those who have it," he said, adding this is one reason the Japanese are so slow to enter the U.S. market.

• Direct marketing organization — "The real key to future success still is direct marketing," according to McClellan, who said firms need their own sales forces to have any control over their own destiny. Many firms have found arrangements with dealers and distributors to be disappointing, if not disastrous.

• Financing — According to McClellan, a company must rely primarily on equity financing "to reduce the risks" in this industry. "Debt is a two-edged sword," he said, noting it is very good in good economic times, but in a recessionary period "it's a disaster."

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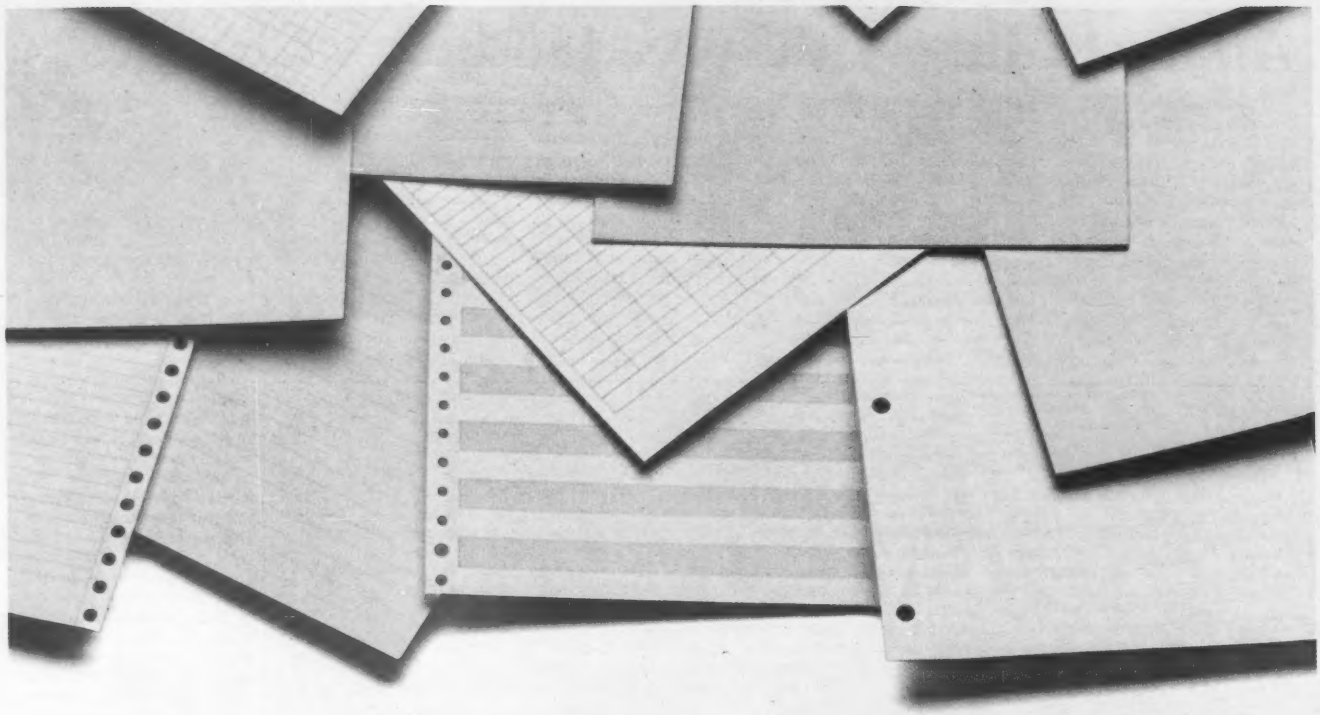

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digital

Executive Urges Industry to Prepare for Change

(Continued from Page 73)

suggested industry members will have to band together in a single, cohesive organization to cope with the commercial, sociological and political implications of this changing industry environment.

Leadership Lacking

"We are a larger and more pervasive industry than any of us now conceives ourselves to be," Haney said. Calling the industry "the wild west frontier for entrepreneurship," he said it lacks responsible leadership to see it through the coming years of change.

Noting the numerous existing industry associations, with varying and often competing interests and goals, he suggested the need for "a broader association" to counter resistance to the information revolution and to coordinate a response to the competitive challenges of Japanese high-technology companies.

"The public, the government and we [the industry] will not listen to a growing multitude of voices — the clamor is confusing," Haney said. While he did not propose a specific model for an all-embracing industry organization, he said he merely wanted to note a need that surely will be filled by someone.

The organization will be necessary, he explained, to deal wih what he called "the three Rs" of the future information society: resistance, revolution and regulation.

Societal resistance to computers and information processing systems will be defused eventually, he said, particularly when today's children are exposed to the technology in school. But, until that happens — in 10 to 15 years — Haney said the industry will have to work to convert the present generation of workers to automation.

To date, he said, the computer revolution "has taken place primarily out of the public's sight." So far, according to Haney, computers have been primarily business tools and as such have changed "not so much what we do, but how we do it."

End-User Confrontation

That phase of industry development is coming to an end, he said, stating personal computing and office automation constitutes the industry's "first confrontation with . . . millions of end users."

Soon, he continued, governments at all levels will start viewing computers as consumer goods. Issues of warranties and consumer protection, which have until now been minimal factors to the industry, will loom large, according to Haney, who envisions computer companies forced to defend their actions before a plethora of government agencies and small claims courts.

And what will become of the industry's efforts to protect trade secrets when its products are in the hands of millions of people? he asked.

These developments are not necessarily bad, he said, "but they raise questions that most of us are not prepared to answer." For instance, he said he expects a reversal of the present trend toward less government regulation of the computer industry, a trend that many in the industry have taken for granted.

Success Assured

On the positive side, Haney said the future health of the U.S. computer industry is all but assured. Brushing aside suggestions that computer companies will be outmuscled by a deregulated AT&T in emerging computer-communications markets, he claimed "a lot of us, especially in the press, have been overimpressed by the size of AT&T, by the expertise of Bell Labs and by the power of Western Electric."

The facts do not substantiate "a scenario of AT&T takeover," he said, remarking that the communications industry has no history of continuous price/performance improvements comparable to that of the data processing industry.

The much-touted integrated voice/data systems and widespread use of fiber optics are a decade in the future, according to Haney, who conceded the telecommunications industry has until now been unable to demonstrate its true potential because of government regulation.

But, he said, the computer industry's track record in applying new technology to a large number of diverse applications persuades him computer companies will play "the key role" in the information processing marketplace of the future.

Motorola Files Copyright Suit

CHICAGO — Motorola, Inc. has filed suit in U.S. District Court here against Computer Displays International, Inc. (CDI) and three former Motorola employees, Robert Gatza, Chris Petri and Thomas Fair.

The suit, filed March 5, charges the defendants with misappropriation of confidential Motorola information and technology relative to the Motorola DS3000 and DS4000 series of display monitors.

These monitors were developed under the code name "Project Alpha," in which Gatza, Petri and Fair were involved.

It also charges the defendants with breach of employment obligations and copyright and trademark infringement, all in connection with CDI's manufacture and sale of its "MPG" series of CRT display monitors.

Motorola is suing the Addison, Ill.-based competitor for preliminary and permanent injunctive relief, in addition to an award of actual and punitive damages.

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THE FIRST DAY OF THE NATIONAL DATA BASE SYMPOSIUM will feature an accelerated class covering the important concepts of data management technology: Data Base Management Systems (DBMS), Teleprocessing Monitors, Query Packages, Reporting Systems, Data Dictionaries, and high-level Source Program Generators.

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These (and other) DBMS packages will be analyzed:

Vendor	Package
Advanced Computer Techniques	Back End DBMS
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Applications Software	ASI-ST, ASI/INQUIRY
Applied Data Research	IDEAL, DATACOM SYS, DEVL ENVRMT SOFT
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Britton Lee	IDM-500
Cincom Systems	TOTAL/MINIS, TIS, MANTIS
Computer Corporation of America	MODEL 204
Computer Science Corporation	MANAGE
Cullinane DB Systems	IDMS, ADS
Data General	DG-DBMS
Digital Equipment Corporation	VAX INFO ARCHITECTURE
Exact Systems and Programming	DMX-4
Gemini	DD QUERY
Hercus	INFO
Hewlett Packard	IMAGE
International Data Base Systems	SEED
Informatics	MARK IV, MARK V
Information Builders	FOCUS
Intel	SYSTEM 2000
Mathematica	RAMIS II
MSP	DATAMANAGER, DESIGNMANAGER
National CSS	NOMAD2
National Information Systems	ACCENT R
Perkin-Elmer	RQL/32, RELIANCE
Prime	Prime DBMS
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Exec Tags U.S. 'Real Loser' In Trade Cutoff to Soviets

By Jake Kirchner
CW Washington Bureau

MIAMI — "It's no wonder the Russians are getting ahead of us. They're the only ones who don't have to spend half their time fighting communism."

That remark got a good laugh when delivered here recently by Robert D. Schmidt, vice-chairman of the Control Data Corp. board of directors and the leading CDC trade strategist. But Schmidt was quite serious in his contention that the U.S. is the real loser when it cuts off nonstrategic trade with the USSR and pressures American allies to do the same.

Schmidt told a meeting of the Computer and Business Equipment Manufacturers Association (Cbema) that trying to punish the Soviets through trade restrictions seriously threatens the North Atlantic Treaty Organization (Nato) alliance and adds to domestic unemployment.

Communist Economic Woes

"Communism, without any help from us, is demonstrating that it is a failed system of government, unable to cope with the realities of the modern [world]," said Schmidt, adding many Eastern Bloc nations are already on the verge of economic collapse.

"The huge debt owed by the East to the West shows how greatly the two world economies have come to depend upon each other," he said. "If we bring the communist countries to their knees, wouldn't the economic chaos and political vacuum that followed be a greater threat to our security than continued coexistence?"

Schmidt was clear to state the need to make "every effort to keep our advanced strategic technology out of the hands of the Soviets and their allies. But in our zeal," he added, "we are controlling too much. We are not only choking off nonstrategic trade with the East[ern] Bloc, but we are making ourselves an unreliable supplier in the eyes of our Western allies.

"We can't afford further loss of world markets," Schmidt said "somehow, we need to develop a balanced perspective of the relationship of military security with the right to trade." When one half of that balance is upset, the other suffers as well.

'A Stabilizing Influence'

He said there is "one reality we all should recognize . . . There is no advantage in not doing business with other nations." Trade by itself will not ensure peace, he said, but it is a stabilizing influence.

"Our Nato alliance is in danger of fragmentation," Schmidt said. "The Reagan administration is showing little or no sensitivity to the concerns of Western Europe. Our beligerent attitude toward the Soviets has our allies worried." He added it is not too late to restore our trading partners' confidence in U.S. suppliers. But the present situation must be reversed soon, he warned, saying failure to do so will hurt many of our alliances and possibly push the communists into impulsive actions.

"Right now they're scared to death of us," he said of the Soviets. Schmidt suggested the danger of the situation is that because the Soviets are not very sophisticated about what is going on in the Western industrialized societies.

Saying the U.S. has a better chance of tempering communist activity if the two sides have closer contact, Schmidt said "If we stand on the outside" — watching the Soviets deal with Japan and Western Europe — "we're going to get some surprises we won't like."

Nickels & Dimes

Datamac Computer Systems has signed a contract with Burr, Egan, Deleage & Co. for venture-capital funding up to $1.3 million at an average price of 55 cents per share.

$ $ $

Wicat Systems, Inc. has announced the completion of $6.9 million of private placement of common stock at $12 per share, increasing the number of outstanding shares to approximately 3.1 million.

$ $ $

Weitek Corp. has received a commitment for funding from Sutter Hill Ventures of Palo Alto, Calif. to complete a round of financing begun last year with the firm's initial investor, InnoVen Capital Corp. of Saddle Brook, N.J. Financing provided by the two firms totals $2.3 million.

$ $ $

Pragma Data Systems, Inc. has announced the closing of its second round of venture-capital financing amounting to $3.5 million. Investors include Continental Capital Corp.; First Interstate Capital, Inc.; Hambrecht & Quist; Inco Securities Corp.; Lawrence WPG & Partners; North American Partners; Oak Investment Partners; Union Venture Corp.; and West Coast Venture Capital.

$ $ $

Mathematica, Inc. declared a three-for-two split of company stock. The split is in the form of a 50% stock distribution and total shares outstanding will increase to approximately 1,060,000.

$ $ $

Amdax Corp. announced the expansion of its board of directors and additional equity financing from E.M. Warburg Pincus & Co.

$ $ $

RCA Corp.'s board of directors voted to reduce the quarterly dividend on common stock from 45 cents to 22 ½ cents per share in an effort to conserve capital and strengthen the company's balance sheet.

$ $ $

Analog Devices Enterprises has completed an investment of $1 million in Charles River Data Systems, Inc. of Natick, Mass., receiving approximately 12% of the company's outstanding stock for the investment.

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30. Software Development
(Software Project Leader, Systems Analyst, Systems/Application Programmer.)
40. Engineering
(Engineer, Scientist, Systems Designer, Project Engineer, Systems/Application Engineer, Technical Staff, Quality Assurance, Design/Development, Field Service/Support Personnel.)
50. Marketing
Marketing Manger, Sales Manager, other Sales & Marketing Personnel.)
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R. M. Lauman, VP Engineering for Bell Telephone Co. of Pennsylvania is involved in all purchasing decisions made by his company. He recommends and purchases equipment from all over the world. Mr. Lauman is very knowledgeable about computer communications. He's also very knowledgeable about *Computer Business News:*

"I wouldn't be without it each week. We have to stay ahead in this business, and CBN is a kind of 'bible' around here. We use it for background, and I see to it that my assistants read it.

"It arrives promptly every Monday morning and I read it with a red pencil in my hand. I make notes in the margin and red line articles before I pass it on down the line in my organization.

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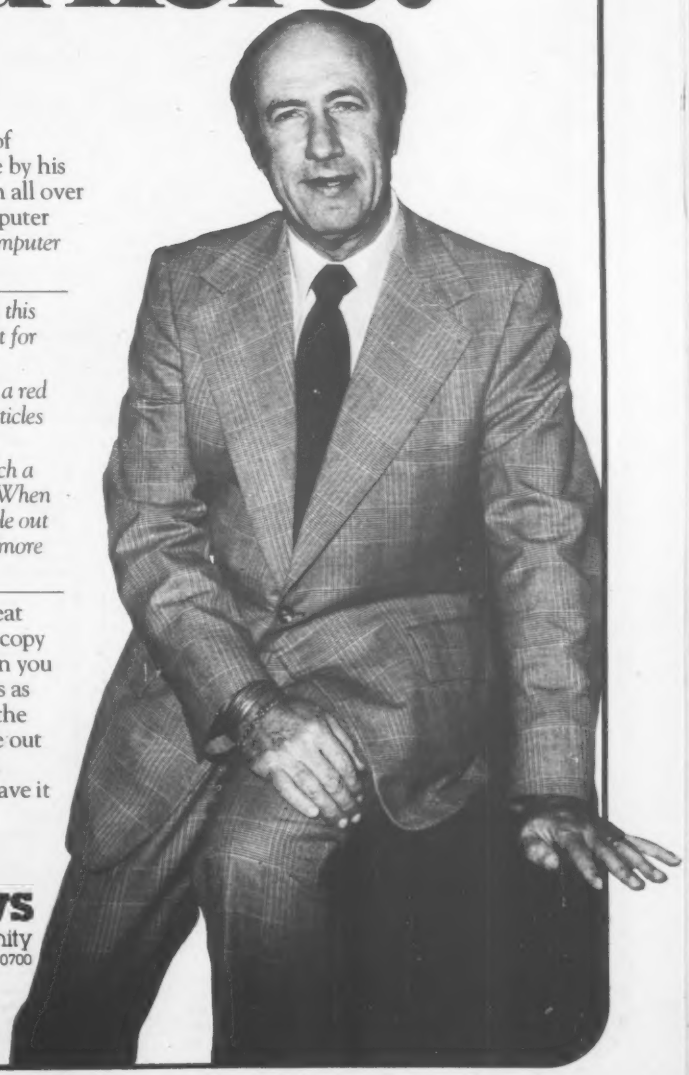
Mr. Lauman thinks the CBN writers and editors do "a great job." And 10 people in his immediate group get to read his copy of CBN when he's finished with it — red pen and all. Can you afford to miss out on your own copy of a publication that's as habit-forming as CBN is to industry executives? Turn to the subscription form for CBN elsewhere in this issue, or take out your American Express, BA/Visa or Mastercard and call, toll-free, 1-800-343-6474 to subscribe today. You should have it coming to you.



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Cbema Reports:

U.S. DP Trade Surplus Healthy But Down

WASHINGTON, D.C. — The U.S. data processing industry maintained a healthy three-to-one trade surplus with the rest of the world computer exporters for 1981.

However, a substantial increase in the imports of DP products last year held the growth of the surplus below the five-year average annual growth of 30%, according to statistics from a major trade association.

Exports of computers and business equipment rose 17% last year to $10.7 billion and imports increased 22% to $3.7 billion, resulting in an overall 1981 U.S. trade surplus of just under $7 billion, the Computer and Business Equipment Manufacturers Association (Cbema) reported.

Last year's overall growth in the trade surplus was 14%, the lowest growth rate during the past five years.

During this five-year period, the sharpest increase in the growth of the surplus for these products was in 1980 when the trade balance grew 47%.

Exports of DP equipment and parts in 1981 represented 82% of the industry's export total, showing a 16% growth from 1980's statistics, according to Cbema.

However, during the year the trade surplus showed a quarter-by-quarter decline ranging from about 28% in the first quarter of last year, to 19% for the first 9 months, to 16% for the full year.

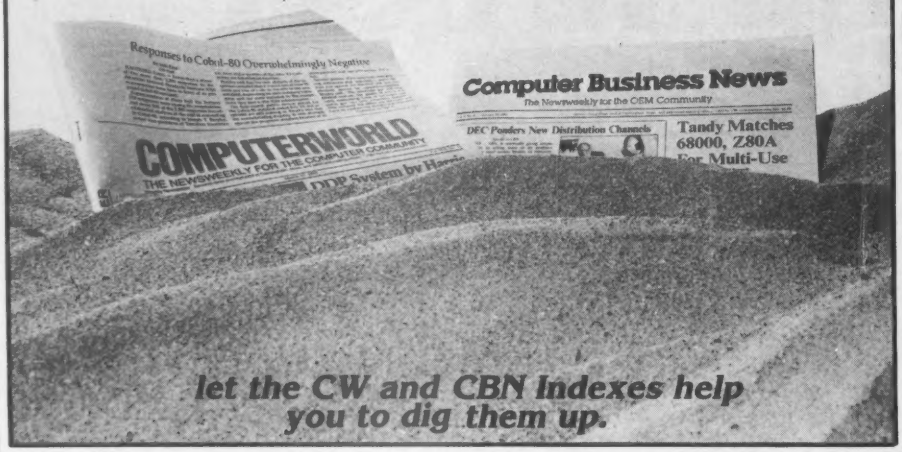
DP Product Imports

Imports of DP products, by contrast, increased 43% during 1981, totaling $1.7 billion for the year. The comparable increase for 1980 was 20%, according to Cbema.

Cbema President Vico E. Henriques said a variety of factors have had an impact on the trade surplus.

Among these are the strengthened position of the U.S. dollar on world money markets, the slowdown in the world economy and "the potential extension of U.S. trade restrictions to nonmarket economies such as the Eastern Bloc countries."

If you've got 9,792 pages of important data from your 1981 copies of* Computerworld *and* Computer Business News *buried somewhere —



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CBN	DISK EQUIPMENT	173
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If you don't have all the back issues of *Computerworld* and *Computer Business News* that you need to get the articles you want, you can order back copies for an entire year on 35 mm microform from University Microfilm, Int. at very reasonable rates. Or you can simply take advantage of their reprint service for individual articles. (More information is found right in the Indexes themselves.)

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Orders & Installations

Amperif Corp. of Chatsworth, Calif., has received an order for its cache disk subsystem from the Kansas City Power & Light Co. The order is valued at approximately $500,000.

Healthcare Information Sciences, Inc. has signed a multiyear agreement with Rex Hospital in Raleigh, N.C., to provide assistance in developing a five-year long-range plan for acquisition/development of a comprehensive hospital information system.

Northern Telecom, Inc. received a $3.4 million order from General Electric Co. to supply and install three SL-1 systems at GE's plants in Syracuse, N.Y.

American Satellite Co. (ASC) has signed a three-year contract with Robinson-Humphrey Co., Inc. to provide satellite communications services. ASC will provide 22 digital voice and 11 data channels for services between Atlanta and New York City.

Decision Data Computer Corp. has been selected by the Missouri-Pacific Railroad to maintain data processing equipment used in the railroad's communications network. The contract is valued at $300,000 annually.

Monsanto Co. and Motorola, Inc. have both purchased Roadrunner Network Management Systems from the Action Communication Systems Division of Honeywell, Inc. The two orders are valued at more than $5 million.

Micro-Z Corp. announced the signing of a $725,000 contract to produce and install two of its microprocessor systems for the Pavillon Hotel currently under construction in Miami.

Runzheimer & Co., Inc. has purchased a Burroughs Corp. B5900 information processing system to help accommodate the company's rapid growth in the U.S. and abroad.

The Sheraton Corp. has signed an agreement to participate in American Airlines' Sabre reservations system.

Digital Communications Associates, Inc. has received an additional order from Citicorp Industrial Credit of Harrison, N.Y., for data communications products, bringing the purchase total to approximately $70,000.

Storage Technology Corp. has announced the sale of several COM2 voice concentrator/multiplexer systems to the People's Republic of China for an undisclosed amount.

Planning Research Corp.'s contract to manage the computer center for the Executive Office of the President has been extended for one year. The renewal has been valued at $2.1 million.

Mergers & Aquisitions

Martin Marietta Corp. has purchased **American Management Systems, Inc.'s (AMS)** IBM-based time-sharing business, which provides time-sharing services to federal government and commercial customers, predominantly in the Washington, D.C. metropolitan area. AMS will retain the remainder of its computer-services business.

Britton-Lee, Inc. has finalized its acquisition of **Insac Software, Inc.** with a stock transfer, giving the British technology group a minority interest in Britton-Lee. Insac will function as an independent company with headquarters in Atlanta and will continue to market its current products.

Qantel Corp. has announced its aquisition of **MTD Project Services**, a software house that develops software packages for specific industries.

Motorola, Inc. has completed its acquisition of **Four-Phase Systems, Inc.** The agreement involved conversion of Four-Phase common stock shares into .763 shares of Motorola common stock. Four-Phase will operate as part of Motorola's newly formed Information Systems Group.

Electronic Data Systems Corp. has acquired **Data Processing of the South (DPS)** through an exchange of stock. DPS will continue to operate under current management and under its existing name.

Information Management International, Inc. announced the acquisition of **Diversified Computer Applications, Inc. (DCA)** in Palo Alto, Calif. DCA provides data processing and computer software services to hospitals, home health agencies and organizations requiring direct-mail and list-management services.

Gould Inc. stockholders voted approval of the acquisition of **American Microsystems, Inc. (AMI)** Under the terms of the agreement, 1.78 shares of Gould common stock will be exchanged for each of AMI's approximately 4,165,000 common and 150,000 preferred shares. AMI will operate as an autonomous subsidiary of Gould.

Enterra Corp. has announced the acquisition of **A.D. Larson Supply Co.** for approximately $3.3 million. Larson manufactures and repairs products used for oil production.

AGS Computers, Inc. has merged into **AGS of International Systems, Inc.**, a computer software company specializing in project management products and services for industry, business and government.

Tymshare, Inc. has acquired **Travel Systems, Inc.** providers of the Travel System 2000, a desktop computer system for travel agents and agencies.

Management Systems Corp. has recently purchased the entire stock of **Computer Translation, Inc. (CTI)**.

New Companies

Multiple Information Systems, Inc. is a new company that was formed to provide a single source for software, computers, terminals and communications equipment. Corporate headquarters are located at 6221 Richmond, Houston, Texas 77057.

SyQuest Technology Inc. is a new firm that will be manufacturing low-cost OEM fixed and removable Winchester disk drives. Product introductions are slated for mid-1982.

Xytex Inc. is a new firm specializing in the design, development, manufacture and marketing of systems that will integrate text processing and image processing for graphic arts, word processing, electronic and electro-optical publishing users. The company can be located at 52 Cummings Park, Woburn, Mass. 01801.

Entre Computer Centers is a new firm offering franchises throughout the country to sell a comprehensive line of personal computers ranging from small home computers to multiuser business systems. Corporate headquarters are located at 8138 Watson, McLean, Va. 22102.

Expansions

Technical Systems Consultants, Inc. of Indiana is relocating to a new office facility at 111 Providence Road, Chapel Hill, N.C. 27514.

Anchor Automation, Inc. has moved into new manufacturing and office facilities, nearly three times the size of its old building.

Racal-Milgo, Inc. broke ground recently for its new 100-acre corporate headquarters complex in Sunrise, Florida.

General Dynamics Communications Co. has announced plans to build a $4 million facility for its Com Dev subsidiary in Sarasotam, Fla. The new facility will consolidate operations presently in four separate locations.

DEC Product Guide Bows

MAYNARD, Mass. — Digital Equipment Corp. has made available a reference service describing the entire range of the company's products and services.

The six-volume reference tool is intended for DP consultants, users of original equipment, volume customers of computer products and software houses. It is broken down into the following sections: DEC's organization and policies; commercial applications; descriptions of high-volume products including terminals, OEM products and microcomputers; software; and 16-, 32-, and 36-bit computer systems.

Updated periodically to ensure currency, the reference service costs $295/year. This price includes the six basic dates and newsletters the vendor said from 129 Parker St., Maynard, Mass. 01754.

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China Computerworld is a joint venture of the Fourth Ministry of Machine Building and CW Communications/Inc. and it includes among its 50,000 subscribers the key government officials and [illegible] managers who have EDP purchase decision authority.

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Executive Corner

• L. Dean McCurry Jr. has been named president of Multiple Information Systems, Inc.

• Gerald S. Casilli has resigned as president of Millennium Systems, a subsidiary of American Microsystems, Inc.

• Jay Popper has been appointed vice-president of the Custom Products Group, and H. Peter Zimbelmann has been appointed to the newly created position of vice-president of quality assurance for Standard Microsystems Corp.

• Chris G. Kenber has been appointed vice-president of sales for Micom Systems, Inc.

• Richard Andreini has been named vice-president of marketing at Datamac Computer Systems, Inc.

• Robert M. Morrill has resigned as vice-president of marketing, but will continue as a consultant at Prime Computer, Inc.

• Robert T. Knight has joined Computer Sciences Corp. as a corporate vice-president.

• Tom Makmann has been promoted to vice-president of sales and marketing at Archive Corp.

• Thomas J. Branca has been appointed to the newly created position of vice-president of finance and chief financial officer at Henco, Inc.

• James J. Heffernan has joined Cosmos Computer Corp. as vice-president of finance, becoming the venture's fourth founding member.

• Wayne E. Stolz and Max D. Stone have been appointed vice-presidents of Midwest Data Systems, Inc.

• Robert Iger has been appointed vice-president of On-Line Business Systems, Inc.'s Software Products Division.

• James R. Youngblood has been named division vice-president of marketing for the Peripherals Division of Pertec Computer Corp.

• M.L. "Spec" Bradley has been promoted to vice-president of Informatics, Inc.'s recently expanded Commercial Information Systems. Also, Edmund Joseph has joined the Management Systems Division as vice-president of product technology.

• Douglas A. Davidson has been appointed executive vice-president of Science Management Corp.

• Girroy E. Mansur has been promoted to vice-president of marketing for Software Design Associates, Inc.

• M. Bruce Nakao has joined Ross Systems, Inc. as vice-president of finance.

• James R. Oyler Jr. has been promoted to the position of vice-president of operations for Harris Corp.'s word processsing activities.

• Jim Miller has been promoted to division vice-president of strategic account sales; Russ Almand has been promoted to group director for domestic sales; and Ben Anixter has been promoted to group director for international sales and corporate marketing for Advanced Micro Devices, Inc.

• William Verdi has been named director of international operations for Cullinane Database Systems, Inc.

• William Steinberger has been promoted to vice-president, education network, at Control Data Corp.

• Ted Dobieski has been named senior vice-president of Northeast Datacom, Inc. and Robert Treat has been appointed vice-president at that company.

• C. Daniel Lynes has been elected vice-president for operations at Solvation, Inc.

• Robert Theriault has been named vice-president, marketing, at Optical Techniques International.

• James Anapol has been promoted to vice-president, business planning and development, and Dr. Issac Nassi has been appointed vice-president of systems at Ontel Corp.

• Alfred H. Jorgensen has been appointed executive vice-president and general manager of the newly formed Information Systems Group at National Data Corp.

• Thomas P. Gilmer has been named vice-president, quality assurance, at Shugart Associates, Inc.

• Gregory J. Bodnar has been named vice-president of research and assistant to the president at Tominy, Inc.

• Edward R. Diamond has been appointed vice-president of data processing services, Remote Computer Services Division, of Dun and Bradstreet Corp.

• David C. Rowe has been named vice-president of finance for Interlan, Inc.

• Robert B. Schmidt has been named vice-president, finance; Daniel M. Murray has been appointed vice-president, marketing; Gary Bowen was promoted to sales manager; and Thomas F. Kenney has been named service manager for the Massachusetts Computer Corp.

• Joseph Onorato has been appointed vice-president of software at CSP, Inc.

• Anthony DiPentima has been named vice-president, engineering, at Summagraphics Corp.

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This step-by-step guide helps busy DP professionals develop and refine the skills of clear, effective writing that are often critical to the successful selling and smooth implementation of a computer project. Geared specifically for the technically trained specialist, this no-frills manual uses a wealth of functional examples to help you master the entire range of written communications used in data processing, including reports and proposals, operations manuals, and system and engineering documentation.
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The premier guide to the field—now completely updated to reflect the dramatic changes in products and markets in the last three years. Here's essential information for anyone who's serious about owning or using microcomputers: features, capabilities, and limitations of commercial hardware and software, and programming languages from BASIC to PASCAL and APL ... the fine points of disk operating systems ... applications programming ... plus new product offerings, new FCC regulations, and detailed lists of retailers, manufacturers, software suppliers.
(1-86164-2) March 1982
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C. Warren Axelrod
The author of *Computer Effectiveness*, which won the *Journal of Systems Management's* Grillo Award, now shows how to achieve efficient, effective information processing that meets the real needs of the end-user. Written from planning, managerial, and control perspectives, this guide gives DP managers, programmers, and systems and software specialists a total approach to computer decision-making. Specific techniques and structures simplify planning, system design and development, system implementation, workload and resource management, and day-to-day scheduling and operations.
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Contracts & Pacts

Federal Data Systems Corp. has been awarded a Defense Department contract with a potential total value of $65 million to collect patient-care work load data from U.S. military treatment facilities worldwide. The contract begins with $4.9 million for the first year, with nine one-year extensions. Federal Data Systems is owned 50% by Electronic Data Systems Corp. and 50% by Datapoint Corp.

SMC Federal Systems, a unit of Science Management Corp. has been awarded a $2.2 million contract by the U.S. Department of Housing and Urban Development (HUD). Under the three-year contract, the company will perform a wide range of functions related to HUD's personnel and payroll systems.

Northern Telecom, Inc. has received an order for 300 Model 435 distributed data processing systems from the U.S. Postal Service. The systems will be used in remote offices nationwide to enter motor vehicle maintenance and inventory accounting data.

Mastercard International, Inc. and the Society for Worldwide Interbank Financial Telecommunication (Swift) have reached an agreement that allows Mastercard's member banks and financial institutions to utilize Swift's data processing and communications facilities for authorizing international card transactions.

Computing Capabilities Corp. announced cancellation of its agreement with Hewlett-Packard Co., under which HP provided distribution and marketing for the Insight II interactive, on-line transaction processing software package for the HP 3000.

General Automation, Inc. (GA) has signed an agreement with Evolution Technology, Inc. granting GA exclusive international distribution rights to Evolution's line of small business computers.

Data Electronics, Inc. has signed an 18-mo multimillion-dollar agreement with Texas Instruments, Inc. to supply cartridge tape drives for use with TI's DS990 line of computer systems.

Planning Research Corp. has been awarded a 30-mo, $5.3 million contract by the U.S. Air Force's Rome Air Development Center to continue its work on the Korean Air Intelligence System. Under a prior contract, Planning Research developed the system and put it into operation in Korea.

Century Data Systems, Inc. has signed a $1.5 million renewal contract to provide Marksman Winchester disk drives to Nestar Systems, Inc., a specialist in locally networked personal computer systems. Century is a subsidiary of Xerox Corp.

Fortune Systems, Inc. has awarded a multimillion-dollar contract to Western Digital Corp. to supply Winchester hard-disk controllers for the recently introduced Fortune 32:16 business computer system.

Ford Aerospace & Communications Corp.'s Engineering and Technical Services Operation has been awarded a contract valued at approximately $18.5 million by the U.S. Air Force Computer Acquisition Center. The contract calls for design, installation and maintenance of computer systems and data acquisition terminals at five U.S. Air Force logistics command centers.

Western Digital Corp. has agreed to purchase in-circuit test systems totaling $.5 million from Zehntel, Inc. Zehntel is a subsidiary of Plantronics, Inc.

Nixdorf Computer Corp. announced a cooperative development project with Spartacus Computers, Inc. for hardware and software components, which will expand the hardware and software spectrum of the Nixdorf 8890 Compatible Information Processing System.

Burroughs Corp. has signed an agreement with Application Development Corp. of Annadale, Va., to assist in marketing Application Development's screen-based, interactive order-entry software packages, which are designed for use with Burroughs computer systems.

Data Electronics, Inc. has been granted a license by the 3M Corp. to manufacture and market the Ansi ¼-in. digital tape cartridge.

Arkansas Systems, Inc. has named The Rebus Group, a San Francisco-area software marketing company, as a distributor for its On-Line Banking Environment software.

Threshold Technology, Inc. has signed an agreement with a newly formed Silicon Valley, Calif., firm to develop a high-resolution graphics terminal for office automation systems, including electronic mail.

M/R Com, Inc.'s Linkabit, Inc. received awards in excess of $5 million from the U.S. Army's Satellite Communications Agency for digital-signal processing equipment to improve the reliability of transmission in defense satellite communications links.

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Anacomp, Inc.'s planned acquisition of DSI Corp. may be challenged by the Justice Department. The head of the department's Antitrust Division said he would sue if Anacomp proceeded with plans to acquire all of DSI's shares.

— — —

Apple Computer, Inc. has begun an investigation and legal action against Asian imitators of its Apple II computer.

— — —

Raytheon Data Systems Co. has announced plans for a 10% increase in the work force at its Norwood, Mass., plant — the result of increased bookings over the past few months.

— — —

Mastercard International, Inc. is undertaking a major reorganization of its telecommunications system in the U.S. by establishing a new data network. Mastercard Advanced Communications System will combine the existing authorization and settlement networks into a single, more powerful network at reduced cost.

— — —

The Association for Computing Machinery has moved to 11 W. 42nd St., New York, N.Y. 10036.

— — —

STSC, Inc. has announced the creation of a wholly owned subsidiary, Management Methods, Inc., to market the company's maintenance scheduling and reporting system, located in Woodland Hills, Calif.

— — —

Seventeen universities involved in computer graphics are the beneficiaries of a donation of PS300 computer graphics systems from Evans & Sutherland Computer Corp.

— — —

Computer Automation, Inc. has announced that recent customer-imposed delays in anticipated deliveries and orders of automatic test equipment and data processing systems will result in a poor third quarter ending March 28.

— — —

Western Union plans to launch its fifth domestic communications satellite — Westar V — on June 8, four months ahead of its previously scheduled launch date.

— — —

Megatek Corp. announced the opening of its European headquarters office, 34 Ave. du Tribunal-Federal, CH-1005, Lausanne, Switzerland. Michel Schwab has been named manager of European operations.

— — —

Mercator Business Systems announced the formation of a wholly owned subsidiary, Mercator Business System GmbH, in Frankfurt, West Germany. The subsidiary will recruit, train and motivate a West German dealer network.

— — —

McDonnell Douglas Automation Co. reported that computer-aided design and manufacturing was its fastest growing product line in 1981, accounting for 15% of its total revenues. The company is a division of McDonnell Douglas Corp.

— — —

Interactive Sciences, Inc. has received a three-year $185,000 grant from the Walter S. Johnson Foundation. The grant will be used to expand its work through schools and community groups to help people make use of personal computers.

— — —

Ibis Systems, Inc. has formed a new unit to develop mass-storage devices employing vertical recording techniques. The division, which is located in Santa Clara, Calif., is headed by Robert D. Fisher.

— — —

The Computer and Business Equipment Manufacturers Association has moved to the 5th Floor, 311 First St., N.W., Washington, D.C. 20001.

— — —

National Data Corp. has announced the formation of the Information Systems Group, consisting of Rapidata, Network Services and Merchandising Data Services Divisions. Alfred H. Jorgensen has been appointed executive vice-president and general manager of the group.

— — —

Datapoint Corp has received Canadian government approval for business investment. Datapoint plans to establish a subsidiary to market and service its office products and systems and to acquire Datapoint-related assets from TRW Data Systems, Toronto.

A donation of $10,000 has been made by Silicon Systems, Inc. to California State University's School of Engineering. The money will be used to initiate a Silicon Systems Junior Professorship fund to recruit new faculty.

— — —

RCA Global Communications, Inc. and ADP, Inc.'s Autonet Division have reached an agreement which provides access to the Autonet network from the 24 overseas points served by RCA Globcom's Low Speed Data Services. This will allow the offices to contribute and receive information from ADP or their own computers in the U.S.

— — —

Hewlett-Packard Co. announced the establishment of a program to help dealers and software developers sell independently developed software for HP personal and hand-held computers.

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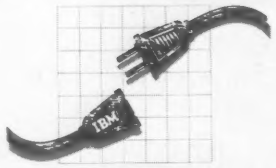

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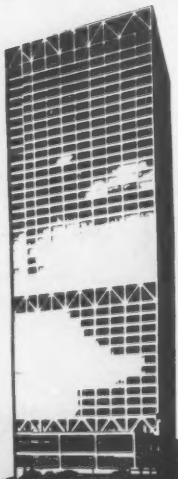

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20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
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50 Wholesale/Retail Trade
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31 Manager/Supervisor Programming
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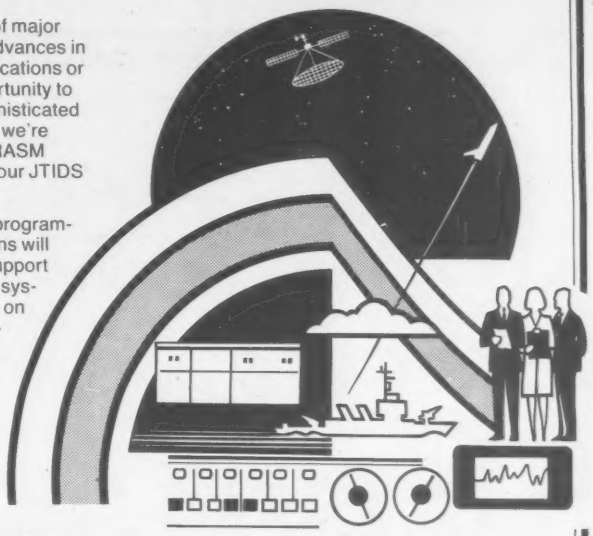

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Will provide technical support for the evaluation and enhancement of performance characteristics of the Michigan Terminal system on the IBM 3033. Will use software and hardware monitoring techniques (Comten hardware monitor) to identify potential bottlenecks and device needs. Knowledge of performance evaluation methodologies, knowledge of IBM architecture, familiarity with IBM assembler language, and experience with internals of an operating system are required.

SYSTEMS PROGRAMMER

Will enhance and support the Michigan Terminal System (MTS), operating system and related software on an IBM 3033. Prior experience with the internals of an operating system is required. Knowledge of IBM assembler language is required.

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SR PROGRAMMER/ ANALYST
LONG ISLAND

A leader in its field, our client is seeking a Senior member for their staff who is experienced in Distribution/Manufacturing systems. Must have 3+ years COBOL, assembler a plus. Work in a project team environment with responsibility for smaller application systems as well as oversee the work of other programmers. Excellent growth potential to management. Fee paid. **$30,000**

ROBERT HALF
of New York, Inc.
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New York, NY 10036
(212) 221-6500

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SYSTEMS ANALYST

Excellent growth. 3 yrs design & coding using COBOL. Mfg bkgrd. Salary to **$26,000**

JR SYSTEMS PROG

Outstanding oppty for sys prog with 1+ yrs exp IBM, OS and BAL. Salary to **$24,000**

PROG/ANALYSTS

Rapidly expanding co offers super growth for pro's with 5 yrs COBOL & OS. CICS a +. Salary to **$25,000**

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of North Carolina, Inc.
Wachovia Bldg., Suite 1117
Greensboro, NC 27401
(919) 274-2448

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PROJECT ADMINISTRATOR

Local NYSE corp is seeking a professional for their MIS staff. Requirements include financial modeling, large IBM mainframe, COBOL and/or PL1 with one of the following financial languages: SCS, ISPS, EPS or CUFFS. In addition, managerial experience is desired. Fee and relocation paid. Salary **$36,000**

Doug Cook
ROBERT HALF
of Jacksonville, Inc.
9550 Regency Square Blvd.
Suite 213
Jacksonville, FL 32211
(904) 721-0970

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Career at a standstill? Desiring a position with unlimited growth? Prestigious financial institution seeks individual with minimum 5 years background in voice & data communications to manage a Series 1 development group, distributed network analysis, new product development including audio response, dial terminal & remote concentration. **$30-36,000**

SR ANALYST APPLICATION DEVELOPMENT

Want the opportunity to design new on-line systems for a multi-billion dollar organization? You'll need several years of programming, analysis, IMS, CICS to get this OS/MVS spec design, non-coding position. An excellent next step for the right person. **$29-33,000**

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777 E. Wisconsin Avenue
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

TAMPA

PROG/ANAL

FL company in urgent need of Sys 38 background with MAPICS. RPG III a must. Low **$20's**

PROG/ANAL

CICS command or macro is what counts. Large IBM hdwe DOS or OS-COBOL. Any appl exp. **$27,000**

SYS PROG

Large IBM hdwe DOS, OS or MVS COBOL. Sysgens Dept expanding CICS/on line/IMS great. **$32,000**

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1311 North Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

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Multiple openings for Sr Prog/Analysts with actg applications bkgrds — to be trained in audit techniques. Also Sr positions for exper'd auditors.

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Manuf Career path to mgm't for Sr Analyst/Prog's with manufacturing bkgrd or consulting exper.

DESIGN SPECIALIST

Prior manufacturing — online DMS, IBM, COBOL environments. Will consult with clients, do frontend design to functional specifications. Leads to major project, management/high visibility, TOTAL and/or APL a +.

Jerry Anderson
Bob Couch
ROBERT HALF
of Northern California, Inc.
Suite 1500, 111 Pine St.
San Francisco, CA 94111
(415) 434-1900

DALLAS

PROGRAMMER ANALYST

Manufacturing company with excellent growth record and financial stability is expanding its staff. Requirements include three yrs COBOL programming involving new development. Must have experience in IBM OS or DOS systems. To **$25,000**

DP MANAGER
SYST 34

West Texas manufacturer is looking for an individual with solid IBM Syst 34 RPG II experience. Mapix experience is a must. Will be responsible for managing a small DP staff. This position calls for a "hands-on" manager. To **$29,000**

John Staiger
ROBERT HALF
of Dallas, Inc.
2 NorthPark East, Suite 750
Dallas, TX 75231
(214) 363-3300

LOUISVILLE

EDP AUDITORS

Many openings exist for jr and sr level positions. 1 to 5 yrs experience in auditing required. A degree is desirable and an advance degree is a plus. Mfg, insurance, banking, some have little or no travel. Salary ranges from jr **$20,000** to sr **$38,000**

SYSTEMS ANALYST

Large insurance firm is seeking a Systems Analyst with 3+ yrs design experience. This is a sr level position. If you have an insurance background, co will interview you within a week. Relocation expenses paid in full plus 10% loan for 2 years. Salary to **$33,000**

DP MANAGER

Several openings exist for managers with experience on System 34, System 315-D, MAPICS and CCP background in manufacturing and insurance. Salary to **$32,000**

PROJECT LEADER

Southern corp is seeking a Project Leader with Honeywell experience in a mfg environment. Degree is a plus. Also looking for 1 with Acctg background. Salary to **$30,000**

Tom Williams
ROBERT HALF
of Louisville, Inc.
680 South Fourth St.
Louisville, KY 40202
(502) 585-1751

PALO ALTO SAN JOSE

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Multiple openings exist at the 2+ years expertise level in VM/MVS, OS/VS1, DOS/VSE, and VTAM or TCAM. To **$40,000**

SR PROGRAMMER ANALYSTS

Multiple openings for COBOL, Basic in a mini environment. One client needs pick operating system experience on Prime, Microdata or Adds Mentor. Ideal geographic location. To **$32,000**

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Linda Strickland
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Palo Alto, CA 94304
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675 No. First St., Ste. 609
San Jose, CA 95112
(408) 293-9040

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For Fortune 500 Co. Been on a team responsible for design or implement of MRP or order processing system? Strong mfg background req'd for this super position. APICS a +. Fee paid. **$25-30,000**

PROGRAMMER/ANALYST

Ready to advance? Exp'd w/IMS DB/DC, structured techniques, data dictionary, COBOL? This growth slot is for you. CICS, TSO a +. Fee paid. **$21-25,000**

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Jim Lee
EDPeople
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PROGRAMMER/ANALYST

Great potential for advancement if you have a technical or engineering background and are experienced with FORTRAN, COBOL and large IBM hardware. OS/VM environment. **$30,000**

PROGRAMMER ANALYST

This unique opportunity requires at least ½ year programming experience on the IBM S/38 and a minimum two years successful RPGII programming experience. Mid **$20's**

Terry H. White
ROBERT HALF
of Atlanta, Inc.
3379 Peachtree Rd. N.E.
P.O. Box 10201
Atlanta, GA 30319
(404) 266-2153

MEMPHIS / NASHVILLE

MIS MANAGER

A large manufacturing firm needs 5 to 7 years experience on IBM 3777 with COBOL, TSO-PANAVLT & RJE. Multi-site responsibilities with some travel. 3 years experience as manager required. Excellent fringe benefits. Salary Mid **30's**

ROBERT HALF
of Tennessee, Inc.
825 Ridge Lake Blvd.
Suite 350
Memphis, TN 38119
(901) 683-5800

1101 Kermit Dr., Suite 407
Nashville, TN 37217
(615) 361-4900

ORLANDO

PROG/ANALYST

COBOL-OS-CICS-IMS. Acctg appl. Some design exp. Mult openings. To **$28,000**

SYS PROG

Word processing devt center needs sys prog with heavy data base sys exp. To **$35,000**

TECH SUPPORT

Telecomm analyst for lg IBM network supporting remote locations. To **$28,000**

Pam Evans
ROBERT HALF
of Orlando, Inc.
2699 Lee Road, Suite 415
P.O. Box 17892
Orlando, FL 32860
(305) 628-2836

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LOS ANGELES

MIS CONSULTANT
JR & SR LEVEL

Outstanding opportunities exist for degreed P/A's and S/A's with solid OS-COBOL exp. CICS or IMS a big plus. Fee paid. **$32-55,000**

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(213) 386-6805

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of Orange County, Inc.
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DENVER

PROJECT LEADER

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Major bank service company seeks a person with MVS/SP or CICS background. Person will report directly to senior mgmt group. Position offers an excellent career path. Start **$30,000** range

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(303) 629-1010

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PROGRAMMER ANALYST

Degree preferred, not required — 7 plus yrs in DP with at least 2 yrs as analyst. On-line COBOL, IBM environment with the responsibility to analyze and staff a new system as well. **$24-30,000**

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of New Mexico, Inc.
P.O. Box 3320
Albuquerque, NM 87190
(505) 884-4557

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CICS PROGRAMMER/ ANALYST

Fortune 500 firm and a leader in its industry seeks CICS programmers and analysts. Flex time, excellent training facilities, great fringe benefits. Requires degree and at least one yr of CICS experience. To **$30,000**

TELECOMMUNICATIONS PROGRAMMER

Large DP service firm (5000 terminals) based in St. Louis seeks a network communications specialist. Must be familiar with IBM SNA and other distributed processing software. Degree preferred, but not required. Two or three years experience needed. To **$36,000**

EDP TECHNICAL WRITER

Nationally known mfg co home based in St. Louis has immediate need for individual with good written and oral communication skills who has the ability to interpret prog data to non-technical users. One to two years experience and a degree a must. To **$25,000**

DP CONSULTANT/BANKING

Major CPA firm seeks consultant type individual who is knowledgeable of bank operations as well as EDP hardware, software and systems. Must be able to travel up to 30%, have an MBA and professional image. Outstanding benefits and bonus plan. **$25-35,000 plus bonus**

Delores Cook
Randy Pace
ROBERT HALF
of St. Louis, Inc.
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

FORT LAUDERDALE

SYSTEMS ANALYST

Fortune 500 company located in beautiful Fort Lauderdale area seeks analyst with solid experience. Background should include 2-3 years with Fortran, Pascal or Assembler. Mini experience a plus. Excellent benefits including profit sharing. Great opportunity. Fee paid. **$25,000**

PROG ANALYST

West Palm Beach company is looking for that one special analyst with data point or micro data experience. 3+ years RPG, databus experience will qualify. PPL a plus. Promotable position. Degree a must. Fee paid. **$23,000**

Jack Subwich
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of Fort Lauderdale, Inc.
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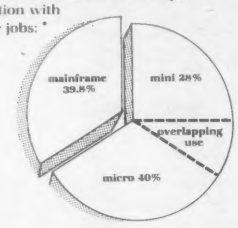

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DIRECTOR

SYSTEMS & PROGRAMMING

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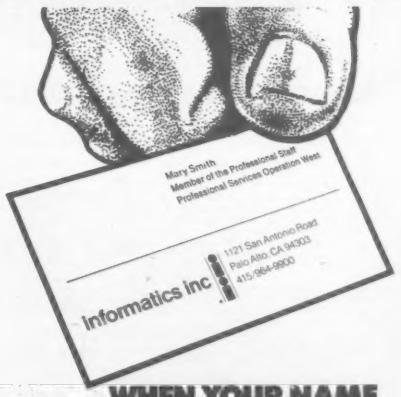

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Please submit vitae, list of publications, estimated period of availability, and a description of research interests by June 30, 1982 to:

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The University of Georgia invites applications and nominations for Director of the Office of Computing and Information Services. Responsibilities include management of the computing facilities (two IBM 370/158 AP systems, a CDC Omega II, a CDC Omega III, a CDC Cyber 750, and a Denelcor HEP) and a staff of 95 people. Qualified applicants should have at least 10 years supervisory and managerial experience in a large academic computing facility, a working knowledge of telecommunications networks and distributed data processing, appropriate technical background in computer systems and their uses in academic institutions, excellent oral and written communications skills, and hold a graduate degree. Please submit resume, with references and and salary requirements, postmarked by May 15, 1982 to:

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Screening Committee
The University of Georgia
Library Administration
Main Library
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The position reports to the Director of the Computer Center in a community college located 40 miles west of Chicago with a total enrollment of approximately 7,000 students. The position is responsible for the maintenance, application, and documentation of all software systems and for designing administrative programs and systems.

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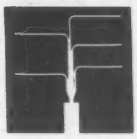

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- DEC - PDP 11/23/34/44/45/70 - VAX 11 780 RSX 11M-K RSTS/E - VAX VMS - MACRO - 11, BASIC 2, FORTRAN/ASSEMBLY LANGUAGE
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NETWORK AND COMMUNICATIONS SYSTEMS PROGRAMMERS

Rensselaer Polytechnic Institute, a private technological university located in upstate New York is continuing to expand services in support of its network of timesharing terminals and distributed mini/microcomputers using the IBM 3033 system. We are seeking qualified individuals to fill the following positions:

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Will participate in the design, implementation, and support of a communications network including possible mixtures of baseband, broadband, and X.25 technologies, using the IBM 3033 as one of several hosts. Previous communication and network design experience is required.

COMMUNICATIONS SYSTEMS PROGRAMMER

Will participate in the support and enhancement of communications software interfacing high-feed asynchronous terminals and computers to the 3033, and in the extension of the software to serve as a local multi-node network supporting several intelligent hosts and network interface machines. Knowledge of DEC PDP-11 assembler language and previous experience with communications hardware and software is required. Familiarity with PASCAL and with IBM 370 assembler language is desirable.

Related degrees are desirable for these positions. RPI offers competitive salaries commensurate with experience and a complete benefits package which includes advanced educational opportunities.

For immediate consideration, interested and qualified applicants should submit resume, 3 professional references and salary requirements to: Thomas F. Molloy, Employment Manager, Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY 12181.

RPI

Rensselaer Polytechnic Institute

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In this technical management position, you will have an opportunity to demonstrate your proven project management/people skills. In this important job, you will implement communications software across a new family of multi-microprocessor based controllers under development in our Communications Group. You may qualify for this challenging position if you have a strong software development and communications background with a BS/MSCS, or equivalent combination of education and experience, and demonstrated success in the following areas:

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Our systems group operates in an open environment, where each individual is encouraged to promote and develop ideas into actively supported projects. We offer an excellent benefit package, and our employees have the opportunity to enter Bachelors, Masters, and Doctoral degree programs. Send resume and salary requirements, in confidence, to: **Richard D. Valente, Schuler Resources Center, Clarkson College, Potsdam, New York 13676.**

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The Boone County, Missouri Government seeks a Data Processing Manager/Systems Analyst.

The ideal candidate will be experience in the management of a small Data Processing Department with Honeywell equipment, and have a significant accounting background. We are currently operating with Honeywell Level 6 hardware using MOD 400 with Cobol.

Salary is commensurate with education and experience. Please send resume and salary history to:

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701 East Broadway
County/City Building, 5th floor
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The deadline for classified advertising is ten days prior to the issue desired. (That's six working days prior to the issue date). Ads may be sent in by mail. For camera-ready ads, a velox or negative is required. For ads to be typeset by us, enclose a layout if needed, along with any logos or artwork you would like to include in the ad. These must be dark and clear for reproduction purposes.

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If you wish a box number to be assigned to your ad, it will cost an additional $10.00.

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NATIONAL UNIVERSITY OF SINGAPORE

THE INSTITUTE OF SYSTEMS SCIENCE

The Institute of Systems Science (ISS) has been established as a resource center to help in the development of Singapore as a regional center for computer software development and services, and to ensure that Singapore has expertise at the upper end of computer technology. Besides conducting courses at the graduate level, ISS also offers courses aimed at upgrading the skills of information systems professionals. ISS is involved in training and research in applied areas such as systems analysis and design, data base management, software engineering, data communications, data processing management and computing methodologies. Applicants must have extensive proven experience and demonstrated competence in computer applications using recent computer technology. Applicants must have sound university education and excellent communication skills. Graduate qualifications are an added advantage.

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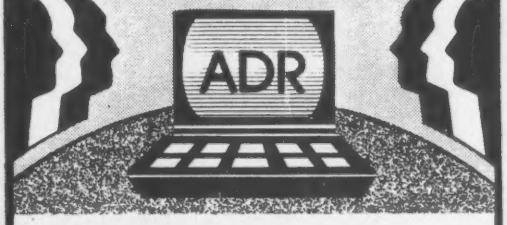

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ADR

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Search Committee for Manager,CDM
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Systems Analyst

SYSTEMS ANALYST

I, II, III
Salary
$1,206-$2,432 per Mo.

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You will develop complex software programs, make recommendations for utilization of hardware/software and conduct market research for acquisition. You will also maintain operating systems and do research and exploration in the field of communications. A BA Degree or equivalent is needed and a minimum of 1 year as a systems software programmer is required plus 2 years' programming experience on an IBM 370 utilizing VM and at least 1 year of PL/1 or Assembler programming experience is necessary.

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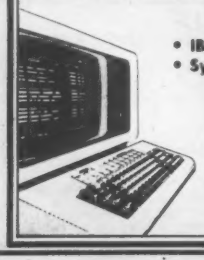

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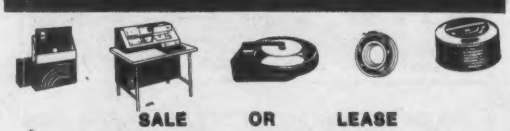

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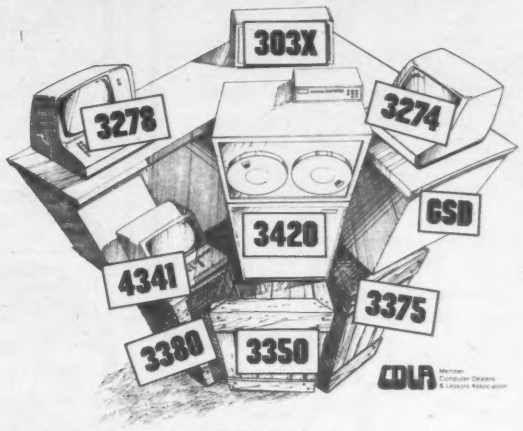

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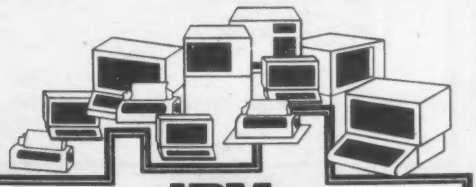

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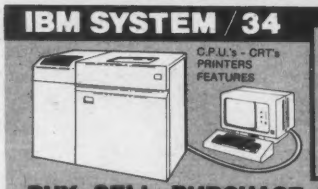

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Bulletin Board ads come in standard units (one column wide by one inch deep) and standard typefaces. (Units may be combined to produce deeper ads, but one column is maximum width and no units of less than one inch are available.) Ads are arranged under headings (such as "IBM", "DEC" or "Software") and within headings, if necessary, by type of equipment. The first line of the ad is set in larger, bold type, and should be the standard equipment identification (such as "IBM S370/Mod 40"). (Headlines may be put on more than one line, if desired.) The body copy should describe the equipment very briefly, give the price and the person to contact. This is all the information an interested buyer needs to follow up. No ad should have more than one piece of equipment or software.

Price for each standard unit is only $99. (One unit minimum, and no fractional units available.) Anyone can place an ad, but no agency commissions are paid, no quantity discounts allowed, and no credit toward rate is given for contract advertisers who advertise in other sections of *Computerworld*. It's a simple and effective system for buying and selling hardware and software.

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Ads are accepted in the mail, over the telecopier or by phone. Ads can be accepted up until the Monday before issue (7 days in advance of issue date). You should write out your ad before submitting it, using no more than 12 characters (including spaces) per line for headlines, and no more than 28 characters (about 5 words) per line in the body copy using our standard typefaces. (A standard unit can take up to 12 lines of body copy, but each line of headline consumes the equivalent of two lines of body copy.)

Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

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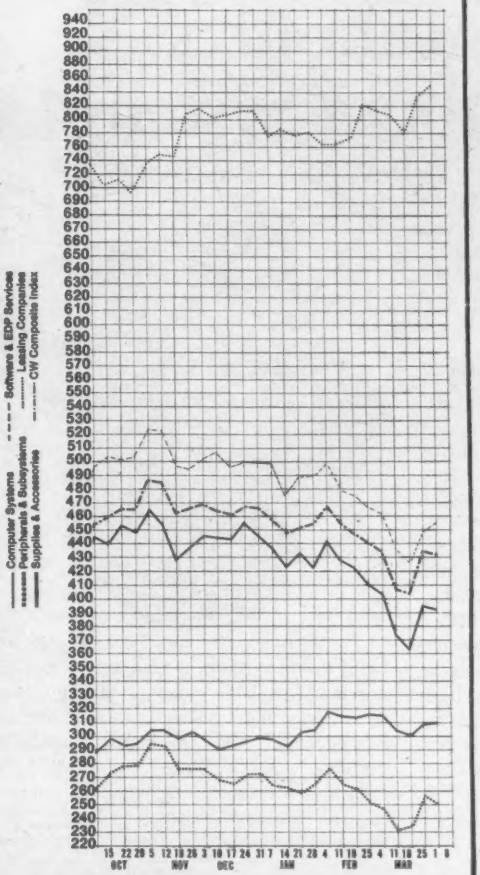

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TRADE QUOTES

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CLOSING PRICES WEDNESDAY, MARCH 31, 1982

E X C H		1981-82 RANGE (1)	CLOSE MAR 31 1982	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	19- 46	19 1/8	+ 1/8	+0.6
N	BURROUGHS CORP	28- 72	34 3/4	+ 5/8	+1.8
O	COMPUTER AUTOMATION	9- 28	7 3/4	-1 1/4	-13.8
N	CONTROL DATA CORP	18- 42	30	-2	-6.2
N	CRAY RESEARCH INC	25- 48	27 3/4	0	0.0
N	DATA GENERAL CORP	27- 87	31 3/4	+ 3/4	+2.4
N	DATAPOINT CORP	20- 88	23 1/8	-1 1/8	-4.6
N	DIGITAL EQUIPMENT	72-113	75 3/4	-2 1/2	-3.1
A	EECO INC	6- 18	7 3/8	+1	+15.6
N	ELECTRONIC ASSOC.	5- 13	7 1/2	+ 1/8	+1.6
N	FOXBORO	42- 82	48	-1 3/8	-2.7
O	FULCRUM COMP GRP	1- 3	1/4	0	0.0
O	GENERAL AUTOMATION	3- 18	5 1/4	+1	+23.5
N	HARRIS CORP	28- 80	28 7/8	-1 1/4	-4.1
N	HEWLETT-PACKARD CO	33- 54	40 3/8	- 7/8	-2.1
N	HONEYWELL INC	83-115	88	+ 1/2	+0.7
N	IBM	48- 73	58 3/4	+ 5/8	+1.0
O	IPL SYSTEMS INC	6- 13	5 1/2	- 1/4	-4.3
O	MADNUSON COMP SYSTS	3- 32	3 5/8	- 1/4	-6.4
N	MANAGEMENT ASSIST	8- 28	12 1/8	- 1/8	-1.0
O	MINI-COMPUTER SYST	0- 4	1 1/8	- 1/8	-10.0
N	MODULAR COMPUTER SYS	7- 32	7	- 1/4	-3.4
N	MOHAWK DATA SCI	10- 32	11 1/2	+ 1/8	+1.0
N	NCR	39- 78	42 1/8	- 1/4	-0.5
N	PRIME COMPUTER INC	17- 48	20 3/4	+1	+5.0
N	PERKIN-ELMER	18- 36	20 1/4	-1 3/8	-6.3
N	SPERRY CORP	27- 65	27 3/4	-1 1/4	-4.3
O	TANDEM COMPUTERS INC	13- 35	23 1/2	- 1/2	-2.0
N	TEXAS INSTRUMENTS	71-151	78 3/4	-1 1/4	-1.5
A	WANG LABS.	22- 46	24 7/8	- 1/2	-1.9
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	18- 29	24 3/4	+1 1/2	+6.4
N	COMDISCO INC	16- 27	23 1/2	- 1/8	-0.5
B	COMMERCE GROUP CORP	1- 2	1/4	0	0.0
O	COMPUTER INVSTRS GRP	1- 4	1/2	0	0.0
O	CONTINENTAL INFO SYS	4- 9	5 1/4	+ 1/4	+5.0
N	DPF INC	5- 13	10	+ 1/4	+2.5
O	ITEL	1- 15	1	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
N	U.S. LEASING	18- 30	23 1/2	- 1/4	-1.0
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	1 1/2	+ 1/4	+20.0
O	ADVANCED SYSTEMS INC	10- 15	12 3/4	+ 1/4	+2.0
O	ANACOMP INC	10- 18	10 3/4	+ 3/8	+3.6
O	ANALYSTS INTL CORP	2- 14	7 1/4	- 1/4	-3.3
A	APPLIED DATA RES.	13- 25	18 3/4	+ 1/4	+1.2
B	ASTRADYNE COMP IND	2- 5	2 3/4	- 1/8	-4.3
N	AUTOMATIC DATA PROC	22- 32	27 1/4	- 1/8	-0.4
O	CGA COMPUTER ASSOC	4- 25	5 1/4	0	0.0
O	COMPUTER HORIZONS	1- 5	2 1/4	0	0.0
O	COMPUTER NETWORK	4- 8	4 3/8	+ 1/8	+2.9
N	COMPUTER SCIENCES	12- 30	12 3/4	- 1/4	-1.9
O	COMPUTER TASK GROUP	10- 23	10 1/2	0	0.0
O	COMPUTER USAGE	2- 10	3	0	0.0
O	COMSERV CORP	8- 18	13 3/4	- 1/2	-3.5
O	COMSHARE	7- 21	7	- 1/2	-6.6
O	CULLINANE DATABASE	15- 37	28	+ 1/2	+1.8
O	DATA DIMENSIONS INC	0- 4	3/8	0	0.0
O	DATATAB	1- 4	7/8	+ 1/4	+40.0
O	DST CORP	4- 9	4 7/8	+ 5/8	+14.7
O	DYATRON CORP	3- 11	3 1/8	+ 1/8	+4.1
N	ELECTRONIC DATA SYST	15- 30	21 1/8	- 5/8	-2.8
O	INFORMATICS INC	10- 23	18 1/2	+1 1/4	+8.1
O	INSYTE CORP	1- 3	1 3/4	0	0.0
O	IPS COMPUTER MARKET.	1- 4	1 1/8	0	0.0
O	KEANE ASSOCIATES	4- 8	4	0	0.0
A	LOGICON	12- 38	12 5/8	-1 1/8	-8.1
O	MNGT SCI AMER INC	17- 26	19 1/4	+ 1/2	+2.6
O	MATHEMATICA INC	12- 28	22 3/4	- 1/4	-1.0
O	MATHEMATICAL APP GRP	14- 28	15 1/2	0	0.0
O	NATIONAL DATA CORP	14- 28	15 5/8	- 1/4	-1.5
N	PLANNING RESEARCH	5- 13	7	- 1/8	-1.7
O	PROGRAMMING & SYS	1- 2	1 3/8	+ 1/8	+10.0
O	REYNOLDS & REYNOLD	16- 26	18 3/4	-1	-5.0
O	SEI CORP	17- 28	23 1/4	+ 1/4	+1.0
O	SHARED MEDICAL SYST	26- 37	27 7/8	- 5/8	-2.1
O	STSC INC	6- 28	8	- 1/4	-4.0
O	SCIENTIFIC COMPUTERS	6- 16	7 1/2	0	0.0
O	SOFTWARE AG	7- 23	7 3/4	+ 1/4	+3.3
N	TYMSHARE INC	16- 38	19 3/8	+1 5/8	+9.1
A	URS CORP	11- 18	11 1/4	+ 1/4	+2.2
N	WYLY CORP	7- 20	7 1/2	- 3/8	-4.7
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	2- 25	1 5/8	- 1/8	-7.1
A	ANDERSON JACOBSON	8- 28	10 7/8	- 1/2	-4.3
O	AUTO-TROL TECHNOLOGY	8- 62	8 1/4	- 3/4	-7.5
O	BANCTEC INC	13- 35	13 1/2	-1 1/2	-10.0
O	BEEHIVE INT'L	8- 18	8 3/4	- 3/4	-10.0
A	BOLT,BERANEK & NEW	9- 25	15 5/8	- 1/8	-0.7
O	CAMBEX CORP	2- 9	2 7/8	+ 1/4	+9.5
N	CENTRONICS DATA COMP	7- 40	11 1/4	+ 3/4	+7.1
A	CETEC CORP	4- 8	4 1/4	+ 1/4	+6.2
O	COMPUTER DEVICES INC	4- 10	6	- 1/8	-2.0
O	COGNITRONICS	2- 11	3	+ 1/8	+4.3
O	COMPUTER COMMUN.	1- 2	1	0	0.0
A	COMPUTER CONSOLES	16- 28	20 5/8	+ 1/8	+0.6
O	COMPUTER TRANSCEIVER	3- 9	4 1/2	- 3/4	-14.2
N	COMPUTERVISION CORP	20- 49	27 1/2	+ 5/8	+2.3
N	COMRAC CORP	17- 28	23	0	0.0
A	DATA ACCESS SYSTEMS	2- 23	2 7/8	0	0.0
A	DATAPRODUCTS CORP	17- 44	19 3/8	- 7/8	-4.3
O	DATUM INC	2- 5	1 1/2	0	0.0
O	DAVID JAMISON CARLYL	3- 7	5 1/2	- 3/8	-6.3
O	DECISION DATA COMPUT	3- 6	3	- 1/4	-7.6
O	DELTA DATA SYSTEMS	2- 4	1 5/8	- 1/8	-7.1
O	DATARAM CORP	4- 15	5 3/4	+ 1/8	+2.2
N	ELECTRONIC M & M	3- 9	3 1/8	0	0.0
O	EVANS & SUTHERLAND	18- 40	23	- 1/4	-1.0
O	GENERAL COMPUTER SYS	1- 12	4 1/2	0	0.0
N	GEN'L DATA COMM IND	7- 19	8 7/8	- 1/8	-1.3
O	GENERAL TERMINAL CP	0- 4	3/8	- 1/4	-40.0
N	HAZELTINE CORP	19- 35	28 1/4	-1 1/4	-4.2
O	INFORMATION INTL INC	8- 17	11 1/4	+ 1/4	+2.2
O	INTEL CORP	21- 51	28 3/4	+1 1/4	+4.5
O	IPL SYSTEMS INC	5- 15	5 1/2	- 1/4	-4.3
A	LUNDY ELECTRONICS	7- 18	7 5/8	+ 1/8	+1.6
A	MSI DATA CORP	11- 27	17	+ 5/8	+3.8
O	NETWORK SYSTEMS CORP	14- 25	17 7/8	+1 1/4	+7.5
O	OMEX	5- 8	3	-2	-40.0
N	PARADYNE CORP	25- 52	31 5/8	-1 1/2	-4.5
A	PENRIL CORP	7- 17	7 5/8	- 1/4	-3.1
O	RAMTEK CORP	9- 23	14	+ 1/8	+0.9
N	RECOGNITION EQUIP	4- 21	4 3/4	+ 1/8	+2.7
O	SCAN DATA	1- 5	3/4	0	0.0
N	STORAGE TECHNOLOGY	18- 40	28	+ 1/8	+0.4
O	STYKES DATATRONICS	8- 34	20 3/4	-1 1/2	-8.7
A	T BAR INC	12- 19	13 7/8	- 3/8	-2.6
A	TEC INC	4- 11	11	+1 5/8	+17.3
N	TEKTRONIX INC	43- 70	48	- 5/8	-1.2
N	TELEX	5- 9	7 3/4	- 1/8	-1.5
O	TESDATA SYSTEMS CP	5- 17	5 1/2	- 3/8	-6.3
A	TYMEPLEX INC	7- 18	8 1/2	- 1/8	-1.4
O	WILTEK INC	1- 3	1 5/8	0	0.0
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	11- 17	11 3/4	- 3/8	-3.0
O	BALTIMORE BUS FORMS	1- 2	1 1/4	0	0.0
N	BARRY WRIGHT	15- 24	18 5/8	+ 1/8	+0.7
O	CYBERMATICS INC	1- 2	1	0	0.0
A	DUPLEX PRODUCTS INC	12- 17	13 3/8	- 1/8	-0.9
N	FANNIE BUS. FORMS	15- 23	17 7/8	+ 1/2	+2.8
N	3M COMPANY	48- 85	54 1/2	+ 1/2	+0.9
O	MOORE CORP LTD	27- 38	30 3/4	- 3/8	-1.2
N	NASHUA CORP	18- 33	18 7/8	+ 1/2	+3.0
O	STANDARD REGISTER	30- 41	38	+1	+2.7
A	TAB PRODUCTS CO	14- 30	14 5/8	- 1/8	-0.8
N	WALLACE BUS FORMS	22- 38	28 1/2	+ 1/2	+1.7

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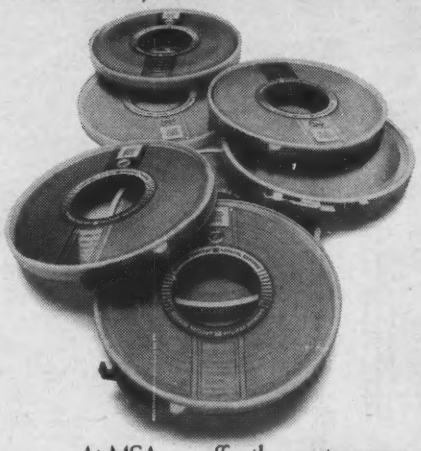

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